ANNUAL REPORT

OF THE

LIGHT-HOUSE BOARD

FOR THE

FISCAL YEAR ENDED JUNE 30, 1900.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1900.

LIGHT-HOUSE BOARD OF THE UNITED STATES.

Organized in conformity to the act of Congress approved August 31, 1852.

LIST OF MEMBERS ON JUNE 30, 1900.

Hon. LYMAN J. GAGE, Secretary of the Treasury, ex officio President.
Rear-Admiral FRANCIS J. HIGGINSON, United States Navy, Chairman.
Col. WALTER S. FRANKLIN.
Lieut. Col. ALEXANDER MACKENZIE, Corps of Engineers, United States Army.
Brig. Gen. GEORGE L. GILLESPIE, Corps of Engineers, United States Army.
Dr. HENRY S. PRITCHETT, Superintendent of the United States Coast and Geodetic Survey.
Capt. YATES STIRLING, United States Navy.
Capt. THOMAS PERRY, United States Navy, Naval Secretary.
Maj. RICHARD L. HOXIE, Corps of Engineers, United States Army, Engineer Secretary.

EXECUTIVE MEMBERS OF THE BOARD.

Rear-Admiral FRANCIS J. HIGGINSON, United States Navy.
Capt. THOMAS PERRY, United States Navy.
Maj. RICHARD L. HOXIE, United States Army.

OFFICERS IN CHARGE OF LIGHT-HOUSE DISTRICTS ON JUNE 30, 1900.

FIRST DISTRICT.

Inspector.—Commander JAMES K. COGSWELL, United States Navy, Portland, Me.

Engineer.—Lieut. Col. WILLIAM S. STANTON, Corps of Engineers, United States Army, Boston, Mass.

SECOND DISTRICT.

Inspector.—Capt. WASHBURN MAYNARD, United States Navy, Boston, Mass.
Engineer.—Lieut. Col. WILLIAM S. STANTON, Corps of Engineers, United States Army, Boston, Mass.

THIRD DISTRICT.

Inspector.—Capt. E. M. SHEPARD, United States Navy, Tompkinsville, N. Y.
Engineer.—Lieut. Col. D. P. HEAP, Corps of Engineers, United States Army, Tompkinsville, N. Y.

FOURTH DISTRICT.

Inspector.—Commander ADOLPH MARIX, United States Navy, Philadelphia, Pa.
Engineer.—Lieut. Col. WILLIAM A. JONES, Corps of Engineers, United States Army, Philadelphia, Pa.

FIFTH DISTRICT.

Inspector.—Commander ALBERT ROSS, United States Navy, Baltimore, Md.
Engineer.—Lieut. Col. WILLIAM A. JONES, Corps of Engineers, United States Army, Baltimore, Md.

SIXTH DISTRICT.

Inspector.—Commander JOHN A. RODGERS, United States Navy, Charleston, S. C.
Engineer.—Capt. J. C. SANFORD, Corps of Engineers, United States Army, Charleston, S. C.

SEVENTH DISTRICT.

Inspector.—Commander FREDERIC SINGER, United States Navy, Key West, Fla.
Engineer.—Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, Mobile, Ala.

EIGHTH DISTRICT.

Inspector.—Commander J. R. SELFRIDGE, United States Navy, New Orleans, La.
Engineer.—Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, Mobile, Ala.

NINTH DISTRICT.

Inspector.—Commander F. M. SYMONDS, United States Navy, Chicago, Ill.
Engineer.—Capt. JAMES G. WARREN, Corps of Engineers, United States Army, Milwaukee, Wis.

TENTH DISTRICT.

Inspector.—Commander FRANKLIN HANFORD, United States Navy, Buffalo, N. Y.
Engineer.—Maj. T. W. SYMONS, Corps of Engineers, United States Army, Buffalo, N. Y.

ELEVENTH DISTRICT.

Inspector.—Commander J. C. WILSON, United States Navy, Detroit, Mich.
Engineer.—Maj. THOMAS H. HANDBURY, Corps of Engineers, United States Army, Detroit, Mich.

TWELFTH DISTRICT.

Inspector.—Commander URIEL SEBREE, United States Navy, San Francisco, Cal.
Engineer.—Maj. C. E. L. B. DAVIS, Corps of Engineers, United States Army, San Francisco, Cal.

THIRTEENTH DISTRICT.

Inspector.—Commander WILLIAM P. DAY, United States Navy, Portland, Oreg.
Engineer.—Capt. WILLIAM C. LANGFITT, Corps of Engineers, United States Army, Portland, Oreg.

FOURTEENTH DISTRICT.

Inspector.—Commander C. T. FORSE, United States Navy, Cincinnati, Ohio.
Engineer.—Maj. WILLIAM H. BIXBY, Corps of Engineers, United States Army, Cincinnati, Ohio.

FIFTEENTH DISTRICT.

Inspector.—Commander URIAH R. HARRIS, United States Navy, St. Louis, Mo.
Engineer.—Lieut. Col. AMOS STICKNEY, Corps of Engineers, United States Army, St. Louis, Mo.

SIXTEENTH DISTRICT.

Inspector.—Lieut. Commander JAMES M. HELM, United States Navy, Memphis, Tenn.
Engineer.—Capt. C. L. POTTER, Corps of Engineers, United States Army, Memphis, Tenn.

CHANGES IN PERSONNEL.

SECOND DISTRICT.

Inspector.—Commander J. R. SELFRIDGE, United States Navy, to December 2, 1899; Commander (now Captain) WASHBURN MAYNARD, United States Navy, from December 12, 1899.

FIFTH DISTRICT.

Inspector.—Commander E. P. WOOD, United States Navy, to December 11, 1899; Capt. YATES STIRLING, United States Navy, from December 15, 1899, to January 15, 1900; Commander ALBERT ROSS, United States Navy, from January 15, 1900.

SIXTH DISTRICT.

Engineer.—Maj. E. H. RUFFNER, Corps of Engineers, United States Army, to January 1, 1900; Capt. J. C. SANFORD, Corps of Engineers, United States Army, from January 1, 1900.

SEVENTH DISTRICT.

Inspector.—Commander N. R. USHER, United States Navy, to October 31, 1899; Commander FREDERIC SINGER, United States Navy, from October 31, 1899.

EIGHTH DISTRICT.

Inspector.—Lieut. Commander A. V. WADHAMS, United States Navy, to September 30, 1899; Commander WASHBURN MAYNARD, United States Navy, from September 30, 1899, to December 6, 1899; Commander J. R. SELFRIDGE, United States Navy, from December 6, 1899.

ELEVENTH DISTRICT.

Inspector.—Commander DUNCAN KENNEDY, United States Navy, to January 11, 1900; Commander J. C. WILSON, United States Navy, from January 11, 1900.

THIRTEENTH DISTRICT.

Inspector.—Commander W. L. FIELD, United States Navy, to November 1, 1899; Commander E. D. TAUSSIG, United States Navy, from November 1, 1899, to May 8, 1900; Commander W. P. DAY, United States Navy, from May 18, 1900.

FOURTEENTH DISTRICT.

Inspector.—Commander C. T. FORSE, United States Navy, to July 2, 1900; Commander W. H. TURNER, United States Navy, from July 2, 1900.

FIFTEENTH DISTRICT.

Inspector.—Commander H. B. MANSFIELD, United States Navy, to December 18, 1899; Lieut. Commander J. M. HELM, United States Navy, from December 18, 1899, to February 15, 1900; Lieut. Commander (now Commander) U. R. HARRIS, United States Navy, from February 15, 1900.

SIXTEENTH DISTRICT.

Engineer.—Capt. H. C. NEWCOMER, Corps of Engineers, United States Army, to January 11, 1900: Capt. C. L. POTTER, Corps of Engineers, United States Army, from January 11, 1900.

REPORT

OF

THE UNITED STATES LIGHT-HOUSE BOARD.

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
Washington, D. C., November 15, 1900.

SIR: The Light-House Board has the honor to submit the following report for the fiscal year which ended on June 30, 1900:

At the close of the year there were under the control of the Light-House Establishment the following-named aids to navigation:

Light-houses and beacon lights	1,248
Light-vessels in position	44
Light-vessels for relief	8
Electric-lighted buoys in position	11
Gas-lighted buoys in position	82
Fog-signals operated by steam, caloric, or oil engines	172
Fog-signals operated by clockwork	221
Post lights	1,783
Day or unlighted beacons	496
Whistling buoys in position	78
Bell buoys in position	120
Other buoys in position, including pile buoys and stakes in Fifth district and buoys in Alaskan waters	4,749

In the construction, care, and maintenance of these aids to navigation there were employed:

Steam tenders	34
Steam launches	11
Sailing tenders	2
Light-keepers	1,394
Other employees, including crews of light-ships and tenders	1,256
Laborers in charge of post lights	1,882

NEW LIGHTS.

The following-named lights were established during the fiscal year:

Plum Beach light-station, Narragansett Bay, Rhode Island.—A fourth-order light July 1, 1899.

Brockway West Channel range post lights, Connecticut River, Connecticut.—Two post-lantern lights July 1, 1899.

Canarsie Dike beacon light-station, Jamaica Bay, New York.—A post-lantern light July 1, 1899.

Petoskey beacon light-station, Lake Michigan, Michigan.—Two post-lantern lights July 1, 1899.

Galloo Island Shoal gas buoy, No. 1, Lake Ontario, New York.—A gas-lighted buoy July 4, 1899.

Lawrence Point Ledge post light, East River, New York.—A post-lantern light July 17, 1899.

Kelleys Island South Shoal gas buoy, No. 2, Lake Erie, Ohio.—A gas-lighted buoy July 18, 1899.

Peach Orchard Point gas buoy, Lake Erie, Ohio.—A gas-lighted buoy July 18, 1899.

Skull Creek beacon light-station, Port Royal Sound, South Carolina.—A post-lantern light July 20, 1899.

Duck Island Breakwater beacon light-station, Long Island Sound, Connecticut.—A post-lantern light August 8, 1899.

New Baltimore Rock post light, Hudson River, New York.—A post-lantern light August 10, 1899.

Mud Lake beacon light-station, Mud Lake, St. Marys River, Michigan.—A lens-lantern light August 15, 1899.

Waukegan Harbor light-station, Lake Michigan, Illinois.—A fourth-order light August 31, 1899.

Racine Reef beacon light-station, Lake Michigan, Wisconsin.—A lens-lantern light August 31, 1899.

Port Gamble post light, Puget Sound, Washington.—A lantern light September 23, 1899.

North Bend light, Coos Bay, Oregon.—A post-lantern light October 1, 1899.

Stave Mill light, Coos Bay, Oregon.—A post-lantern light October 1, 1899.

Hen and Chickens Shoal beacon light-station, Hawk Channel, Florida.—A post-lantern light October 1, 1899.

East Turtle Shoal beacon light-station, Hawk Channel, Florida.—A post-lantern light October 1, 1899.

East Washerwoman Shoal beacon light-station, Hawk Channel, Florida.—A post-lantern light October 1, 1899.

Four-foot Shoal beacon light-station, Hawk Channel, Florida.—A post-lantern light October 1, 1899.

Fort Popham beacon light-station, Kennebec River, Maine.—A lens-lantern light October 19, 1899.

Elizabeth River entrance gas buoy, Hampton Roads, Virginia.—A gas-lighted buoy November 1, 1899.

Orient Point light-station, Long Island Sound, New York.—A fifth-order light November 10, 1899.

Oyster Beds range light-station, entrance to Savannah River, South Carolina.—A reflector light in rear structure November 14, 1899.

Housatonic River Breakwater beacon light-station, Long Island Sound, Connecticut.—A post-lantern light November 20, 1899.

Hog Island Channel beacon light-station, No. 2, Charleston Harbor, South Carolina.—A post-lantern light November 27, 1899.

Old Field Point post light, Elk River, Maryland.—A post-lantern light December 1, 1899.

Burwells Bay range post lights, James River, Virginia.—Two post-lantern lights December 1, 1899.

Homewood post light, James River, Virginia.—A post-lantern light December 1, 1899.

Goose Hill Channel range post lights, James River, Virginia.—Two post-lantern lights December 1, 1899.

Sunken Marsh range post lights, James River, Virginia.—Two post-lantern lights December 1, 1899.

Harrison Bar range post lights, James River, Virginia.—Two post-lantern lights December 1, 1899.

Wood Wharf post light, James River, Virginia.—A post-lantern light December 1, 1899.

Picketts Wharf post light, James River, Virginia.—A post-lantern light December 1, 1899.

Jones Neck lower post light, James River, Virginia.—A post-lantern light December 1, 1899.

Jones Neck upper post light, James River, Virginia.—A post-lantern light December 1, 1899.

Meadowville post light, James River, Virginia.—A post-lantern light December 1, 1899.

Falling Creek post light, James River, Virginia.—A post-lantern light December 1, 1899.

Warwick Bar post light, James River, Virginia.—A post-lantern light December 1, 1899.

Goodes Rock lower post light, James River, Virginia.—A post-lantern light December 1, 1899.

Goodes Rock upper post light, James River, Virginia.—A post-lantern light December 1, 1899.

Grand Island post light, Sacramento River, California.—A post-lantern light December 1, 1899.

Beacon light No. 3½, San Diego Bay, California.—A post-lantern light December 15, 1899.

New Haven Outer Breakwater light-station, New Haven Harbor, Connecticut.—A fourth-order light January 1, 1900.

Sewell Point Spit beacon light, Hampton Roads, Virginia.—A post-lantern light January 1, 1900.

Willoughby Spit beacon light, Hampton Roads, Virginia.—A post-lantern light January 1, 1900.

Mobile Ship Channel light No. 16, Mobile Bay, Alabama.—An additional lens-lantern light January 11, 1900.

New Haven Middle Breakwater (east end) beacon light-station, New Haven Harbor, Connecticut.—An additional post-lantern light January 20, 1900.

Horn Island Pass beacon light-station, Mississippi Sound, Mississippi.—A lens-lantern light February 15, 1900.

Round Island Spit beacon light, Mississippi Sound, Mississippi.—A lens-lantern light February 15, 1900.

New Canal post light, Mississippi River, Louisiana.—A post-lantern light February 17, 1900.

Fort Jackson Point post light, Mississippi River, Louisiana.—A post-lantern light February 18, 1900.

Jesuit Bend post light, Mississippi River, Louisiana.—A post-lantern light February 20, 1900.

Red Fish Bar Cut light-station, Galveston Bay, Texas.—A fifth-order light March 20, 1900.

Sandusky Bay outer range light-station, Sandusky Bay, Ohio.—Two fifth-order lights April 1, 1900.

Jetty Sands range post lights, Columbia River, Oregon.—Two post-lantern lights April 15, 1900.

Upper Turn beacon light, Lynn Harbor, Massachusetts.—A post-lantern light April 16, 1900.

Lake St. Clair Twenty-foot Channel gas buoys, Lake St. Clair, Michigan.—Eight gas-lighted buoys April 17 and 18, 1900.

Wades Point beacon light-station, Pamlico River, North Carolina.—A post-lantern light May 1, 1900.

St. Clair Flats Canal lower entrance (west side) gas buoy No. 21, Lake St. Clair, Michigan.—A gas-lighted buoy May 3, 1900.

Rains Island gas buoy No. 9, St. Marys River, Michigan.—A gas-lighted buoy May 14, 1900.

Johnsons Point gas buoy No. 17, St. Marys River, Michigan.—A gas-lighted buoy May 14, 1900.

Rains Island Shoal gas buoy No. 19, St. Marys River, Michigan.—A gas-lighted buoy May 14, 1900.

North Middle Ground gas buoy, St. Marys River, Michigan.—A gas-lighted buoy May 15, 1900.

Glencove Breakwater beacon light-station, Hempstead Harbor, New York.—A post-lantern light May 21, 1900.

Bald Head range beacon lights, Cape Fear River, North Carolina.—Two post-lantern lights June 30, 1900.

NEW FOG-SIGNALS.

During the fiscal year the following-named fog-signals were established:

Plum Beach light-station, Narragansett Bay, Rhode Island.—A bell struck by machinery July 1, 1899.

Presqu' ile fog-signal station, entrance to Erie Harbor, Pennsylvania.—A 10-inch steam whistle August 1, 1899.

Castle Rocks electric fog-bell buoy, Boston Harbor, Massachusetts.—An electric-bell buoy April 1, 1900.

Red Fish Bar Cut light-station, Galveston Bay, Texas.—A bell struck by machinery April 3, 1900.

Governors Island (east end) fog-signal station, New York Harbor, New York.—A bell struck by machinery May 25, 1900.

During the fiscal year fog-signals were established at the following-named existing light-stations:

Calumet Pierhead (South Chicago) light-station, Lake Michigan, Illinois.—A 10-inch steam whistle July 1, 1899.

Muskegon Pierhead range light-station, Lake Michigan, Michigan.—A 10-inch steam whistle September 15, 1899.

Tawas light-station, Lake Huron, Michigan.—A 10-inch steam whistle September 28, 1899.

Sabine Point light-station, Providence River, Rhode Island.—A bell struck by machinery October 31, 1899.

Grand Traverse light-station, Lake Michigan, Michigan.—A 10-inch steam whistle December 19, 1899.

La Playa light-station, San Diego Bay, California.—A bell struck by machinery January 21, 1900.

New Haven Long Wharf light-station, New Haven Harbor, Connecticut.—A bell struck by machinery February 28, 1900.

Escanaba light-station, Green Bay, Michigan.—A bell struck by machinery April 18, 1900.

Palmer Island light-station, New Bedford Harbor, Massachusetts.—A bell struck by machinery May 31, 1900.

Warwick light-station, Narragansett Bay, Rhode Island.—A blower siren June 1, 1900.

Orient Point light-station, Long Island Sound, New York.—A blower siren June 1, 1900.

Conanicut Island light-station, Narragansett Bay, Rhode Island.—A blower siren June 30, 1900.

Pomham Rocks light-station, Providence River, Rhode Island.—A blower siren June 30, 1900.

New Haven Outer Breakwater light-station, Long Island Sound, Connecticut.—A second-class siren June 30, 1900.

LIGHTS DISCONTINUED.

In the course of the fiscal year the following-named lights were discontinued:

Plum Beach light-station, Narragansett Bay, Rhode Island.—A lantern light July 1, 1899.

Tail Point pile cluster beacon light, Green Bay, Wisconsin.—A lantern light July 31, 1899.

Mud Lake turning gas buoy, Mud Lake, St. Marys River, Michigan.—Light discontinued August 15, 1899.

Waukegan Harbor beacon light, Lake Michigan, Illinois.—A lantern light August 31, 1899.

Island Beach beacon light, No. 5 Sandy Hook Bay, New York.—A lantern light October —, 1899.

Pablo Creek post light, St. Johns River, Florida.—Structure carried away and light discontinued October 22, 1899.

Sullivans Island Cove pierhead light, Charleston Harbor, South Carolina.—A lantern light November 27, 1899.

East side of channel beacon light, Charleston Harbor, South Carolina.—A lantern light November 27, 1899.

Middle Cedar Creek post light No. 2½, St. Johns River, Florida.—April 1, 1900.

Erie light-station, Lake Erie, Pennsylvania.—A third-order light opening of navigation, 1900.

Ballard Reef light-vessel No. 63, Detroit River, Michigan.—Discontinued at the opening of navigation, 1900.

Lower Mile Point Cut post light M2, St. Johns River, Florida.—April 17, 1900.

North Cut (upper) beacon light, Tampa Bay, Florida.—A post-lantern light June 1, 1900.

Upper Mile Point Cut post light M6, St. Johns River, Florida.—A post-lantern light June 17, 1900.

Kenosha Pierhead range front light-station, Lake Michigan, Wisconsin.—A post-lantern light June 18, 1900.

CHANGES IN LIGHTS.

During the fiscal year the following changes were made in existing lights:

Gull Rocks light-station, Narragansett Bay, Rhode Island.—Intensity of lights increased July 5, 1899.

Perkins Island light-station, Kennebec River, Maine.—An additional fixed white sector established July 10, 1899.

Chambers Island light-station, Green Bay, Wisconsin.—Characteristic of light changed July 13, 1899.

Menasha River lower beacon light, Little Butte des Morts Lake, Wisconsin.—Color, height, and arc of illumination changed July 17, 1899.

Menasha River upper beacon light, Lake Winnebago, Wisconsin.—Color, height, and arc of illumination changed July 18, 1899.

Menasha River lower beacon light, Little Butte des Morts Lake, Wisconsin.—Height and arc of illumination of light increased July 24; color changed August 27, 1899.

Mayport range front beacon light, St. Johns River, Florida.—Color of structure changed August 1, 1899.

Beavertail light-station, Narragansett Bay, Rhode Island.—Color of tower changed August 15, 1899.

Sacketts Harbor light-station, Black River Bay, New York.—Height of light increased August 25, 1899.

Cape Neddick light-station, seacoast of Maine.—Color of tower changed September 1, 1899.

Tybee range front light, entrance to Savannah River, Georgia.—Color of light changed September 15, 1899.

Muskegon Pierhead range light-station, Lake Michigan, Michigan.—Front light changed to lens lantern and established in new structure at a height of 33 feet above lake level, September 15, 1899.

Doubling Point light-station, Kennebec River, Maine.—Height decreased September 25, 1899.

Bulkhead range beacon lights, Apalachicola Bay, Florida.—Color of lights changed and height of rear light increased September 30, 1899.

Turning Point beacon light, entrance to Cedar Keys Harbor, Florida.—Color of light changed October 3, 1899.

Hunters post light, Columbia River, Oregon.—Color of light changed October 10, 1899.

Annisquam Harbor light-station, seacoast of Massachusetts.—Color of tower changed October 16, 1899.

Egg Rock light-station, Boston Bay, Massachusetts.—Color of tower changed October 16, 1899.

Presque Isle Harbor range rear light-station, Lake Huron, Michigan.—Light changed to show in the harbor October —, 1899.

Conneaut range front light-station, entrance to Conneaut Harbor, Ohio.—Arc of illumination increased October 25, 1899.

Mount Pleasant range lights, Charlestown Harbor, South Carolina.—Color of front light changed; order of rear light changed October 31, 1899.

Queenstown Creek range rear beacon light No. 3, Chester River, Maryland.—Color of light changed November 1, 1899.

Point Betsey light-station, Lake Michigan, Michigan.—Color of tower and dwelling changed November 3, 1899.

Oyster Beds range light-station, entrance to Savannah River, South Carolina.—Order of front light changed November 14, 1899.

North Brother Island light-station, East River, New York.—Intensity of light increased November 29, 1899.

Stingray Point light-station, Chesapeake Bay, Virginia.—Light changed to illuminate the entire horizon December 7, 1899.

Drum Point light-station, Chesapeake Bay, Maryland.—Dark sector inserted in light December 10, 1899.

Northwest Point Royal Shoal light-station, Pamlico Sound, North Carolina.—Fourth-order light discontinued; post-lantern light established; characteristic changed January 15, 1900.

Red Fish Bar light-station, Galveston Bay, Texas.—Order of light decreased February 26, 1900.

New Haven Long Wharf light-station, New Haven Harbor, Connecticut.—Order of light changed and light established in new tower February 28, 1900.

Sturgeon Bay Canal pierhead light-station, Lake Michigan, Wisconsin.—Order of light increased March 15, 1900.

Red Fish Bar light-station, Galveston Bay, Texas.—Color of light changed April 1, 1900.

Sand Beach (Harbor of Refuge) light-station, Lake Huron, Michigan.—Color of tower changed April 12, 1900.

Port Austin Reef light-station, Lake Huron, Michigan.—Light established in new tower April 12, 1900.

Fort Carroll light-station, Patapsco River, Maryland.—Characteristic of light changed by insertion of red sector April 14, 1900.

Buffalo light-station, Lake Erie, New York.—Color of tower changed April 21, 1900.

Conneaut range light-station, Lake Erie, Ohio.—Order of lights increased April 24, 1900.

South Pass light-station, Mississippi River, Louisiana.—Color of tower changed April 30, 1900.

Orient Point light-station, Long Island Sound, New York.—Order of light increased May 1, 1900.

Elbow beacon light, Green Bay, Wisconsin.—Arc of illumination increased May 1, 1900.

North gas buoy, Galveston entrance, Texas.—Color of light changed May 7, 1900.

Grassy Island South Channel range rear light-station, Detroit River, Michigan.—Height of light increased May 10, 1900.

Little River light-station, Cutler Harbor, Maine.—Color of tower changed May 20, 1900.

Great Duck Island light-station, seacoast of Maine.—Color of tower changed May 20, 1900.

Governors Island post light-station, New York Harbor, New York.—Order of lights and height of upper light increased May 21, 1900.

Fort Niagara light-station, Lake Ontario, New York.—Height of light increased May 21, 1900.

Niagara River range front light-station, Niagara River, New York.—Order of light increased April 23; light established in New York tower May —, 1900.

Mamajuda range rear light-station, Detroit River, Michigan.—Light reestablished in new tower and height of light increased May 31, 1900.

Northwest Point Royal Shoal light-station, Pamlico Sound, North Carolina.—Color of light changed June 1, 1900.

Charlotte Harbor light-station, Charlotte Harbor, Florida.—Characteristic of light changed June 1, 1900.

Manistee Pierhead light-station, Lake Michigan, Michigan.—Order of light and height increased June 9, 1900.

Mobile Point beacon light-station, Mobile Bay, Alabama.—Color and appearance of tower changed June 20, 1900.

Grande Pointe au Sable light-station, Lake Michigan, Michigan.—Color of tower changed June 26, 1900.

Gull Rocks light-station, Newport Harbor, Rhode Island.—Color of light changed June 27, 1900.

Borden Flats light-station, Mount Hope Bay, Massachusetts.—Color of light changed June 27, 1900.

Sabine Point light-station, Providence River, Rhode Island.—Color of light changed June 27, 1900.

Fuller Rock light-station, Providence River, Rhode Island.—Color of light changed June 27, 1900.

Sassafras Point light-station, Providence River, Rhode Island.—Color of light changed June 27, 1900.

Rondout North Dike post light (end), Hudson River, New York.—Order and height of light increased June 30, 1900.

White Shoal light-station, James River, Virginia.—Red sector inserted in light June 30, 1900.

Jordan Point light-station, James River, Virginia.—Red sector inserted June 30, 1900.

Ogdensburg light-station, St. Lawrence River, New York.—Height of light increased and color of tower changed June 30, 1900.

Erie range No. 1 light-station, Lake Erie, Pennsylvania.—Height of light increased June 30, 1900.

FOG-SIGNALS DISCONTINUED.

In the course of the fiscal year the following-named fog-signals were discontinued:

Muskegon Pierhead range rear light-station, Lake Michigan, Michigan.—A bell September 15, 1899.

State Ledge electric fog-bell buoy, Boston Harbor, Massachusetts.—Discontinued December 15, 1899.

Northwest Point Royal Shoal light-station, Pamlico Sound, North Carolina.—A bell struck by machinery January 15, 1900.

Red Fish Bar light-station, Galveston Bay, Texas.—Bell struck by machinery February 26, 1900.

CHANGES IN FOG-SIGNALS.

During the fiscal year the following-named changes were made in fog-signals:

Mount Desert light-station, seacoast of Maine.—Characteristic of fog-signal changed July 31, 1899.

Manana Island fog-signal station, seacoast of Maine.—Characteristic of fog-signal changed July 31, 1899.

West Quoddy Head light-station, seacoast of Maine.—Characteristic of fog-signal changed August 31, 1899.

Cuckolds fog-signal station, seacoast of Maine.—Color changed September 20, 1899.

Libby Island light-station, seacoast of Maine.—Characteristic of fog-signal changed October 1, 1899.

Beavertail light-station, Narragansett Bay, Rhode Island.—Changed from 10-inch steam whistle to compressed-air siren November 10, 1899.

Mount Desert light-station, seacoast of Maine.—Characteristic of fog-signal changed December 20, 1899.

Great Duck Island light-station, seacoast of Maine.—Characteristic of fog-signal changed December 20, 1899.

Little Gull Island light-station, Long Island Sound, New York.—Characteristic of fog-signal changed January 20, 1900.

Smith Point light-station, Chesapeake Bay, Virginia.—Daboll trumpet established in place of fog bell February 10, 1900.

Fenwick Island Shoal light-vessel, No. 52, seacoast of Maryland.—Characteristic of fog-signal changed March 22, 1900.

Point No Point light-station, Puget Sound, Washington.—Fog-signal changed to Daboll trumpet April 1, 1900.

Tibbetts Point light-station, St. Lawrence River, New York.—Characteristic of fog-signal changed at opening of navigation, 1900.

Presqu' ile Pierhead light-station, Lake Erie, Pennsylvania.—Fog bell moved to new structure at the opening of navigation, 1900.

CHANGES IN LOCATION.

During the fiscal year the following-described changes in location were made:

Joshua Rocks post light, Connecticut River, Connecticut.—Moved about 30 feet to westward July 22, 1899.

Tail Point light-station, Green Bay, Wisconsin.—Light and fog-signal moved to new structure July 31, 1899.

Galloo Island Shoal gas buoy No. 1, Lake Ontario, New York.—Shifted slightly to westward August 16, 1899.

Tybee range front light, entrance to Savannah River, Georgia.—Moved 112 feet S. by W. ¾ W. September 15, 1899.

Dunkirk Pierhead light-station, entrance to Dunkirk Harbor, New York.—Moved 25 feet NE. ½ N. to new structure September 15, 1899.

Doubling Point light-station, Kennebec River, Maine.—Moved 532 feet N. 50° W. September 25, 1899.

Isle aux Pêches range front beacon light, Lake St. Clair, Michigan.—Rebuilt 500 feet nearer the rear light October 3, 1899.

Lansing Shoal gas buoy, Lake Michigan, Michigan.—Moved one-third mile SE. by S. October 4, 1899.

Milwaukee Breakwater light-station, Lake Michigan, Wisconsin.—Lights moved 874 feet southerly October 11, 1899.

Bloody Point range, front, light-station, entrance to Savannah River, South Carolina.—Moved 15 feet to seaward October 13, 1899.

Black River range light-station, Lake Erie, Ohio.—Rear light moved nearer the front light October 21, 1899.

Maumee Straight Channel entrance gas buoy No. 1, Maumee Bay, Ohio.—Moved 1,600 feet NE. by E. October 24, 1899.

Lower Mile Point Cut post light, M2, St. Johns River, Florida.—Moved 250 feet southerly November 2, 1899.

Rockland Breakwater light-station, entrance to Rockland Harbor, Maine.—Lights moved to new structure 785 feet southerly November 20, 1899.

Hog Island beacon light No. 1, Charleston Harbor, South Carolina.—Moved 3,600 feet NE. by E. November 27, 1899.

Sturgeon Bay Canal, Northwest Entrance light No. 3, Wisconsin.—Moved 400 feet to eastward November 28, 1899.

Bloody Point range front light, Savannah River, South Carolina.—Moved 60 feet nearer rear light and established in a new structure December 22, 1899.

Boston light-vessel No. 54, Boston Harbor, Massachusetts.—Station moved 1 mile to northward January 9, 1900.

North gas buoy, Galveston entrance, Texas.—Moved 600 feet southeasterly January 12, 1900.

South gas buoy, Galveston entrance, Texas.—Moved 600 feet southeasterly January 12, 1900.

La Playa light-station, San Diego Bay, California.—Moved 380 feet to southward and eastward January 21, 1900.

Black Marsh Channel light, Lynn Harbor, Massachusetts.—Moved 210 feet W. by S. February 10, 1900.

St. Philips Bend post light, Mississippi River, Louisiana.—Moved one-fourth mile to eastward February 18, 1900.

Harris Bayou post light, Mississippi River, Louisiana.—Moved one-fourth mile northwesterly February 19, 1900.

Favret post light, Mississippi River, Louisiana.—Moved one-half mile northwesterly February 20, 1900.

McCall Flat post light, Mississippi River, Louisiana.—Moved 1 mile to northward February 21, 1900.

Ballard Reef Channel gas buoys, Detroit River, Michigan.—Three gas-lighted buoys moved to easterly side of channel April 12, 1900.

Pollock Rip Slue gas buoy, Nantucket Sound entrance, Massachusetts.—Moved to southward and eastward April 17, 1900.

Erie Harbor outer gas buoy No. 2, Lake Erie, Pennsylvania.—Moved to the eastward May 2, 1900.

South Cut (upper) beacon light, Tampa Bay, Florida.—Moved 2,800 feet N. § E. May 20, 1900.

Kalamazoo Pierhead light-station, Lake Michigan, Michigan.—Light moved to post on outer end of pier May 31, 1900.

Manistee Pierhead light-station, Lake Michigan, Michigan.—Light moved to top of fog-signal building on outer end of pier June 9, 1900.

NEW BUOYS.

During the fiscal year the following-named special buoys were established:

Galloo Island Shoal gas buoy, No. 1, Lake Ontario, New York.—A gas-lighted buoy July 4, 1899.

Charleston whistling buoy, entrance to Charleston Harbor, South Carolina.—A whistling buoy July 11, 1899.

Kelleys Island South Shoal gas buoy, No. 2, Lake Erie, Ohio.—A gas-lighted buoy July 18, 1899.

Peach Orchard Point gas buoy, Lake Erie, Ohio.—A gas-lighted buoy July 18, 1899.

Mosquito Island bell buoy, Muscle Ridge Channel, Maine.—A bell buoy July 24, 1899.

Off Santa Barbara whistling buoy, Santa Barbara, California.—A whistling buoy September 12, 1899.

Willoughby Spit bell buoy, Hampton Roads, Virginia.—A bell buoy October 1, 1899.

Elizabeth River entrance bell buoy, Hampton Roads, Virginia.—A bell buoy November 1, 1899.

Elizabeth River entrance gas buoy, Hampton Roads, Virginia.—A gas-lighted buoy November 1, 1899.

Thieves Ledge whistling buoy, Boston Harbor, Massachusetts.—A whistling buoy January 9, 1900.

Castle Rocks electric fog-bell buoy, Boston Harbor, Massachusetts.—An electric-bell buoy April 1, 1900.

Umpqua River Outside Bar whistling buoy, seacoast of Oregon.—A second-class whistling buoy April 13, 1900.

Lake St. Clair Twenty-foot Channel gas buoys, Lake St. Clair, Michigan.—Eight gas-lighted buoys April 17 and 18, 1900.

Hawk Channel entrance bell buoy, Hawk Channel, Florida.—A bell buoy May 2, 1900.

St. Clair Flats Canal lower entrance (west side) gas buoy, No. 21, Lake St. Clair, Michigan.—A gas-lighted buoy May 3, 1900.

Rains Island gas buoy, No. 9, St. Marys River, Michigan.—A gas-lighted buoy May 14, 1900.

Johnsons Point gas buoy, No. 17, St. Marys River, Michigan.—A gas-lighted buoy, May 14, 1900.

Rains Island Shoal gas buoy, No. 19, St. Marys River, Michigan.—A gas-lighted buoy May 14, 1900.

North Middle Ground gas buoy, St. Marys River, Michigan.—A gas-lighted buoy May 15, 1900.

Caucus Cut entrance whistling buoy, entrance to Pensacola Bay, Florida—A whistling buoy June 2, 1900,

Back River entrance bell buoy, Chesapeake Bay, Virginia.—A bell buoy June 15, 1900.

BUOYS DISCONTINUED.

In the course of the fiscal year the following-named special buoys were discontinued:

Plum Beach Shoal bell buoy, Narragansett Bay, Rhode Island.—Discontinued July 27, 1899.

Mud Lake Turning gas buoy, Mud Lake, St. Marys River, Michigan.—A gas-lighted buoy August 15, 1899.

State Ledge electric fog-bell buoy, Boston Harbor, Massachusetts.—An electric fog-bell buoy December 15, 1899.

Pensacola entrance whistling buoy, entrance to Pensacola Bay, Florida.—A whistling buoy June 2, 1900.

New Haven Harbor bell buoy, Long Island Sound, Connecticut.—A bell buoy June 15, 1900.

TEMPORARY CHANGES IN AIDS TO NAVIGATION.

The following temporary changes were made in aids to navigation during the fiscal year:

Brenton Reef light-vessel, entrance to Narragansett Bay, Rhode Island.—Light-vessel No. 39 withdrawn for repairs and station marked by relief light-vessel No. 20 July 2, 1899; light-vessel No. 39 replaced on station and relief light-vessel No. 20 withdrawn March 8, 1900.

Mount Desert light-station, seacoast of Maine.—Fog-signal reported disabled and not sounding July 6; put in working order.

Hen and Chickens light-vessel, Vineyard Sound, Massachusetts.—Light-vessel No. 2 withdrawn for repairs and station marked by relief light-vessel No. 9 July 11; light-vessel No. 2 replaced on station and relief light-vessel No. 9 withdrawn August 21, 1899.

Northeast End light-vessel, seacoast of New Jersey.—Fog-signal machinery disabled; bell rung by hand July —, 1899. Light-vessel No. 44 withdrawn for repairs and station marked by relief light-vessel No. 16 August 21; light-vessel No. 44 replaced on station and relief light-vessel No. 16 withdrawn September 28, 1899.

Five-fathom Bank light-vessel, entrance to Delaware Bay, New Jersey.—Light-vessel No. 40 temporarily withdrawn for repairs and station marked by relief light-vessel No. 16 July 14; light vessel No. 40 replaced on station and relief light-vessel No. 16 withdrawn August 21, 1899.

Martins Industry light-vessel, seacoast of South Carolina.—Light-vessel No. 53 withdrawn for repairs and station marked by relief light-vessel No. 29 July 15; light-vessel No. 53 replaced on station and relief light-vessel No. 29 withdrawn August 3, 1899. Light-vessel No. 53 withdrawn for repairs and station marked by relief light-vessel No. 29 May 20; light-vessel No. 53 replaced on station and relief light-vessel No. 29 withdrawn June 21, 1900.

Vineyard Sound (Sow and Pigs) light-vessel, entrance to Vineyard Sound, Massachusetts.—Light-vessel No. 41 withdrawn for repairs and station marked by relief light-vessel No. 58 July 16; light-vessel No. 41 replaced on station and relief light-vessel No. 58 withdrawn August 19, 1899; light-vessel No. 41 withdrawn for repairs and station marked by relief light-vessel No. 58 December 13, 1899; light-vessel No. 41 replaced on station and relief light-vessel No. 58 withdrawn January 13, 1900.

Menasha River lower beacon light, Little Butte des Morts Lake, Wisconsin.—Structure destroyed by fire July 19; reestablished July 24, 1899.

Isle aux Pêches range beacon light-station, Lake St. Clair, Michigan.—Carried away and temporarily discontinued July 27; reestablished August 4, 1899. Structure from which front light was shown carried away and light extinguished and both lights temporarily discontinued September 17; front structure rebuilt and lights reestablished October 3, 1899. Structure from which front light was shown carried away by ice December 26, 1899; structure from which rear light was shown carried away by ice January 10, 1900; structures rebuilt and lights reestablished April, 28, 1900.

State Ledge electric fog-bell buoy, Boston Harbor, Massachusetts.—Temporarily withdrawn from station August 2; replaced on station November 27, 1899.

Chapel Hill range cut electric buoy, New York Lower Bay, New York.—Temporarily removed and station marked by a black spar showing a lantern light August 5, 1899; electric buoy replaced and spar buoy withdrawn June 29, 1900.

Carrabelle River range beacon lights, St. George Sound, Florida.—Lights damaged by storm August 6; reestablished on temporary structures August 7, 1899.

Caravan wreck gas buoy, Chesapeake Bay, Virginia.—A gas-lighted buoy discontinued August 15, 1899.

Diamond Shoal light-vessel, seacoast of North Carolina.—Light-vessel No. 69 withdrawn to repair damage sustained in storm of August 15–18; station marked by light-vessel No. 71 October 9, 1899. Reported 4 miles northeasterly from her correct position January 29; replaced on station February 24, 1900. Dragged out of position April 5; replaced on station April 9, 1900.

Cape Hatteras beacon light, seacoast of North Carolina.—Post destroyed during storm of August 15 and 16; post and light reestablished August 26, 1899.

Humboldt Bay entrance range front beacon light, Humboldt Bay, California.—Structure damaged by fire and light extinguished August 17; light reestablished August 18, 1899.

Handkerchief light-vessel No. 4, entrance to Nantucket Sound, Massachusetts.—Light-vessel No. 4 withdrawn for repairs and station marked by relief light-vessel No. 9 August 22; light-vessel No. 4 replaced on station and relief light-vessel No. 9 withdrawn November 3, 1899.

Sandy Hook light-vessel, entrance to New York Lower Bay, New York.—Light-vessel No. 51 replaced on station and relief light-vessel No. 11 withdrawn August 23, 1899.

Scotland light-vessel, entrance to New York Lower Bay, New York.—Light-vessel No. 7 withdrawn for repairs and station marked by relief light-vessel No. 11 August 23; light-vessel No. 7 replaced on station and relief light-vessel No. 11 withdrawn October 19, 1899.

Old West End Pier bell buoy, New York Lower Bay, New York.—Damaged by collision and removed from its station September 7; replaced on its station October 21; damaged and withdrawn for repairs October 31; replaced on station November 22, 1899; damaged by collision and removed from its station March 10, 1900.

Superior Bay Channel (lower) post light, Lake Superior, Wisconsin.—Structure carried away and light extinguished September 7; structure rebuilt and light reestablished September 15, 1899; carried away by ice; reestablished May 7, 1900.

Off Point Buchon whistling buoy, seacoast of California.—Reported not sounding; put in working order September 10, 1899.

Gedney Channel electric buoys, New York Lower Bay, New York.—Lights extinguished September 11, relighted September 13; extinguished September 16, relighted September 18; extinguished September 29, relighted October 3, 1899; extinguished January 8, relighted January 9; lights extinguished; relighted February 27; extinguished March 3, relighted March 8, 1900.

Ballard Reef Channel middle gas buoy, Detroit River, Michigan.—Dragged from position and light extinguished September 11; replaced and relighted September 26, 1899.

San Francisco light-vessel, entrance to San Francisco Harbor, California.—Light-vessel No. 70 withdrawn for repairs and station marked by a first-class can buoy September 20; light-house tender *Madroño* moored on station, characteristics of lights and fog signal changed September 28; light-vessel No. 70 replaced on station, characteristics of lights and fog signal restored, and *Madroño* withdrawn October 8, 1899. Oil lights shown in place of electric lights from May 5 to May 11, 1900. Sounding of fog whistle discontinued from June 18 to June 26, 1900.

Wreck gas buoy, New York Lower Bay, New York.—A gas-lighted buoy September 22; discontinued November 15, 1899.

Russell Island upper light, St Clair River, Michigan.—Structure carried away and light extinguished September 25, 1899; reestablished. Structure carried away and light extinguished April 16, 1900; temporary light established on upper end of Russell Island.

Nantucket Shoals light-vessel, Nantucket Shoals, Massachusetts.—Light-vessel No. 66 withdrawn for repairs and station marked by relief light-vessel No. 58; characteristic of light temporarily changed September 26; light-vessel No. 66 replaced, characteristic of light restored, and relief light-vessel No. 58 withdrawn October 8, 1899. Broke adrift January 2; replaced January 6, 1900.

Alcatraz light-station, San Francisco Bay, California.—Fog-bell machinery reported out of order and not sounding September 27; repaired October 4, 1899.

Fenwick Island Shoal light-vessel, seacoast of Maryland.—Light-vessel No. 52 withdrawn for repairs and station marked by relief light-vessel No. 16 September 28; light-vessel No. 52 replaced on station and relief light-vessel No. 16 withdrawn November 2, 1899.

Bell buoy, broken part of Pollock Rip (N. part), entrance to Nantucket Sound, Massachusetts.—Reported adrift October 9; replaced on station October 10, 1899; out of position January 8, replaced January 10; dragged out of position and replaced February 19; missing, replaced May 9, 1900; damaged by collision; replaced by new buoy June 10, 1900.

Sail Rock whistling buoy, off West Quoddy Head, Maine.—Reported not sounding October 12; replaced by another buoy October 21, 1899.

Erie Harbor inner gas buoy, No. 8, entrance to Erie Harbor, Pennsylvania.—Owing to dredging operations the buoy was temporarily moved about 75 feet to the westward October 13, 1899.

Robinson Point light-station, Puget Sound, Washington.—The sounding of the 12-inch steam whistle was discontinued for repairs from October 15 to November 1, 1899.

Two Forty wreck gas buoy, Boston Harbor, Massachusetts.—A gas-lighted buoy established October 23; discontinued October 25, 1899.

Lower Cedar Creek Cut post light, C 3, St. Johns, River, Florida.—Structure blown down and light extinguished October 30; structure rebuilt and light reestablished November 3, 1899.

Dancey Flat post light No. 51, St. Johns River, Florida.—Structure blown down and light temporarily shown from a pole October 30, 1899.

Cape Charles light-vessel, seacoast of Virginia.—Light-vessel No. 49 adrift from her station October 31; replaced November 12, 1899.

Normans Woe bell buoy, Gloucester Harbor, Massachusetts.—Capsized November 1; replaced by another buoy November 2, 1899; sunk; replaced by new buoy March 20, 1900.

Hog Island Shoal light-vessel, Narragansett Bay, Rhode Island.—Light-vessel No. 12 withdrawn for repairs and station marked by light-house tender *Cactus;* characteristic of light changed November 1; light-vessel No. 12 replaced on station, characteristic of light restored, and *Cactus* withdrawn November 2, 1899.

Kenosha Pierhead range front light, Lake Michigan, Wisconsin.—Structure carried away in gale November 1; light reestablished on temporary structure November 5, 1899.

Galloo Island Shoal gas buoy, No. 1, Lake Ontario, New York.—Light extinguished November 4, 1899; not relighted before close of navigation. Light extinguished June 19; relighted June —, 1900.

Winter Quarter Shoal light-vessel, seacoast of Virginia.—Light vessel No. 45 withdrawn for repairs and station marked by relief light-vessel No. 16 November 5; light-vessel No. 45 replaced on station and relief light-vessel No. 16 withdrawn December 14, 1899.

Inner gas buoy, entrance to Galveston Harbor, Texas.—Found extinguished November 8; replaced and light exhibited December 27, 1899. Light extinguished March 26; relighted April 18, 1900.

Fort Carroll light-station, Patapsco River, Maryland.—Moved 100 feet in a southerly direction November 10, 1899; replaced in position April 14, 1900.

Turning Point beacon light, entrance to Cedar Keys Harbor, Florida.—Structure wrecked and temporary light shown November 16, 1899.

Umatilla Reef light-vessel, No. 67, seacoast of Washington.—Adrift from station November 17; replaced December 14, 1899; temporarily withdrawn for repairs and station marked by gas-lighted buoy May 18, 1900.

Off Point Pinos whistling buoy, Monterey Bay, California.—Reported adrift November 18; replaced November 20, 1899.

Pollock Rip light-vessel, No. 47, entrance to Nantucket Sound, Massachusetts.—Dragged from station November 23; replaced November 24, 1899; withdrawn for repairs and station marked by relief light-vessel No. 58 June 12, 1900.

Noon Day Rock bell buoy, San Francisco Bay entrance, California.—Reported adrift November 29; replaced by new buoy December 2, 1899.

Columbia River light-vessel, No. 50, seacoast of Oregon.—Driven from station November 30; station marked by buoy December 17, 1899.

Erie Range light-station, No. 1, entrance to Erie Harbor, Pennsylvania.—Temporary light shown from temporary structure to permit repairs to pier November —, 1899.

Great Marsh Island Shoal post light, No. 1, St. Johns River, Florida.—Blown down December 4, 1899; reestablished January 21, 1900.

Charleston light-vessel, seacoast of South Carolina.—Light-vessel No. 34 withdrawn for repairs and station marked by relief light-vessel No. 29 December 10, 1899; light-vessel No. 34 replaced on station and relief light-vessel No. 29 withdrawn May 19, 1900.

Ontonagon Pierhead light-station, Lake Superior, Michigan.—Structure carried away in storm December 12, 1899; reestablished in temporary tower April 16, 1900.

Southwest end of Middle Ground bell buoy, Pensacola Bay, Florida.—Found adrift; replaced on station December 15, 1899.

Cedar Keys light-station, Cedar Keys, Florida.—Characteristic of light changed December 20, 1899; reestablished March 20, 1900.

Enterprise beacon light, No. 2, Wadmelaw River, South Carolina.—Reestablished December 22, 1899.

North gas buoy, Galveston entrance, Texas.—Removed December 26, 1899; replaced January 12, 1900. Removed from station May 27; replaced June 3, 1900.

South gas buoy, Galveston entrance, Texas.—Removed December 26, 1899; replaced January 12, 1900. Removed from station May 27; replaced June 3, 1900.

Second Turn gas buoy, Galveston Harbor, Texas.—Removed December 27, 1899; replaced January 3, 1900. Extinguished February 17; relighted and color of light changed temporarily February 19; characteristic changed March 7; original characteristic restored April 16, 1900.

Meadowville post light, James River, Virginia.—Structure carried away and light extinguished December 31; rebuilt and light reestablished March 31, 1900.

East Bank gas buoy, No. 6, New York Lower Bay.—Damaged by collision and withdrawn January 3; replaced March 14, 1900.

Coan River gas buoy, No. 5, Potomac River, Maryland.—Extinguished January 4, 1900; relighted January —, 1900.

Resolute wreck gas buoy, Boston Harbor, Massachusetts.—Established January 5; discontinued January 9, 1900.

Middle Cedar Creek Cut post light, No. 2½, St. Johns River, Florida.—Structure carried away January 10; light reestablished January 21, 1900.

Old Field Point post light, Elk River, Maryland.—Carried away by ice January 19; temporary light established May 10; permanent light established June 1, 1900.

Farallon light-station, seacoast of California.—Siren discontinued from January 19 to 24, 1900.

Satanella wreck light, New York Lower Bay.—Discontinued January 26, 1900.

Ardandhu wreck gas buoy, Vineyard Sound, Massachusetts.—Established January 28, 1900.

Lake St. Clair Twenty-Foot Channel lights, Lake St. Clair, Michigan.—Structures carried away by ice in January, 1900.

Fauntleroy Rock bell buoy, Crescent City Harbor entrance, California.—Disabled February 2; put in working order March 13; disabled March 24; repaired.

Elizabeth River entrance gas buoy, Hampton Roads, Virginia.—Extinguished; relighted February 3, 1900.

Andrews Brothers wreck lighted buoy, Newark Bay, New Jersey.—Established February 12; discontinued February 15, 1900.

Rockhall Creek range front beacon light No. 1, Rockhall Creek, Maryland.—Structure carried away by ice February 15, 1900.

Bush Bluff light-vessel, Elizabeth River, Virginia.—Dragged out of position February 25; replaced March 7, 1900.

Entrance bell buoy, Charlotte Harbor, Florida.—Capsized February 26; replaced in position March 27, 1900.

Blunts Reef whistling buoy, seacoast of California.—Disappeared March 6; replaced March 14, 1900.

Jerry Ledge bell buoy, Narragaugus Bay, Maine.—Adrift March 6; replaced March 19, 1900.

Great Salt Pond Breakwater (outer end) beacon light-station, Block Island, Rhode Island.—Light extinguished March 13; relighted March 20, 1900. Fog signal temporarily discontinued March 13, 1900.

Smith Point light-station, Chesapeake Bay, Virginia.—Fog signal disabled; repaired March 13, 1900.

Georges Island Rocks gas buoy, No. 5, Boston Harbor, Massachusetts.—Light extinguished; relighted March 17, 1900.

Outer whistling buoy, Chincoteague Shoals, seacoast of Virginia.—Dragged to the southward March 19; replaced April 8, 1900.

Gloucester Breakwater gas buoy, Gloucester Harbor, Massachusetts.—Light extinguished; relighted March 22, 1900.

Gasparilla Island light-station, entrance to Charlotte Harbor, Florida.—Characteristic of light changed March 23; original characteristic reestablished June 20, 1900.

Brigantine Shoal whistling buoy, seacoast of New Jersey.—Out of position March 26; replaced April 7, 1900.

Queenstown Creek range front beacon light, No. 1, Chester river, Maryland.—Destroyed by ice March —, 1900.

Abraham Richardson wreck gas buoy, Vineyard Sound, Massachusetts.—Established April 2; discontinued April 13, 1900.

North Breaker bell buoy, Savannah River entrance, Georgia.—Adrift April 4; replaced April 14, 1900.

Cornfield Point light-vessel, Long Island Sound, Connecticut.—Light-vessel No. 48 withdrawn for repairs and station marked by relief light-vessel No. 20 April 5; light-vessel No. 48 replaced and relief light-vessel No. 20 withdrawn August 8, 1900.

Off Gurnet Point whistling buoy, seacoast of Massachusetts.—Missing April 7; replaced April 8, 1900.

Ragged Point Spit gas buoy, No. 9, Potomac River, Maryland.—Light extinguished April 10; relighted April 14, 1900.

Smith Island range rear post light, Cape Fear River, North Carolina.—Struck by lightning April 12; reestablished April 15, 1900.

Red Fish Bar light-station, Galveston Bay, Texas.—Light extinguished April 13; relighted June 1, 1900.

Russell Island upper light, No. 12, St. Clair River, Michigan.—Structure carried away by ice and light extinguished April 16; temporary light established.

Lower Hay Lake Cut east side (middle) light, No. 12, St. Marys River, Michigan.—Structure carried away by ice and light extinguished April 18, 1900.

Galveston North Jetty light-station, Galveston entrance, Texas.—Light extinguished April 24, relighted May 18, 1900.

Quebec Channel post light, Superior Bay, Wisconsin.—Carried away by ice; reestablished May 7, 1900.

Superior Bay Channel (lower middle) post light, Superior Bay, Wisconsin.—Carried away by ice; reestablished May 7, 1900.

Superior Bay Channel (upper middle) post light, Superior Bay, Wisconsin.—Carried away by ice; reestablished May 7, 1900.

Superior Bay channel (upper) post light, Superior Bay, Wisconsin.—Carried away by ice; reestablished May 7, 1900.

Connors Point and Rice Point range post lights, Superior Bay, Minnesota.—Carried away by ice; reestablished May 7, 1900.

Ohio Central Coal Dock post light, Superior Bay, Minnesota.—Carried away by ice; reestablished May 7, 1900.

North Channel east range post light, St. Louis Bay, Minnesota.—Carried away by ice; reestablished May 7, 1900.

North Channel and South Channel west range post lights, St. Louis Bay, Minnesota.—Carried away by ice; reestablished May 7, 1900.

Portage River range front light, No. 3, Portage River, Michigan.—Structure carried away by ice and light extinguished May 9, 1900.

Portage River range front light, No. 9, Portage River, Michigan.—Structure carried away by ice and light extinguished May 9, 1900.

Portage River light, No. 12, Portage River, Michigan.—Structure carried away by ice and light extinguished May 9, 1900.

Portage River range front light, No. 13, Portage River, Michigan.—Structure carried away by ice and light extinguished May 9, 1900.

Portage River range lights, Nos. 14 and 15, Portage River, Michigan.—Structures carried away by ice and lights extinguished May 9, 1900.

Leader wreck lighted buoy, Detroit River, Michigan.—A lantern light May 28; carried away June 12; reestablished June 14, 1900; discontinued.

Connors Point range front post light, Superior Bay, Minnesota.—Carried away June 1; reestablished June 4, 1900.

Succonnessett Shoal light-vessel, Nantucket Sound, Massachusetts.—Light-vessel No. 6 withdrawn for repairs and station marked by relief light-vessel No. 9, June 5, 1900.

Point Abbaye Shoal (north) bell buoy, Lake Superior, Michigan.—Carried away at the close of navigation, 1899; replaced June 13, 1900.

Buffalo Breakwater (north end) light-station, Lake Erie, New York.—Fog bell substituted for whistle from June 20 to July 20, 1900.

Moose Peak whistling buoy, seacoast of Maine.—Disabled June 21; put in working order June 22, 1900.

Frying Pan Shoals light-vesset, seacoast of North Carolina.—Light-vessel No. 1 withdrawn for repairs and station marked by relief light-vessel No. 29, June 26, 1900. Light-vessel No. 1 replaced on station and relief light-vessel No. 29 withdrawn June 29, 1900.

Aids to navigation maintained by Light-House Board, June 30, 1900.

Aids.	First district.	Second district.	Third district.	Fourth district.	Fifth district.	Sixth district.	Seventh district.	Eighth district.	Ninth district.	Tenth district.	Eleventh district.	Twelfth district.	Thirteenth district.	Fourteenth district.	Fifteenth district.	Sixteenth district.	Atlantic coast.	Pacific coast.	Lake coast.	Western rivers.	Total 1899.	Total 1900.	Increase or decrease.
Electric lights		3	2														5				5	5	
First-order lights	2	4	5	5	7	7	3	2				9	9				40	18			58	58	
Second-order lights	7	3	2			1		3	1		2	1					16	1	3		19	20	+ 1
Third-order lights	5	1	10	3		4	6	6	9	5	9	3	2				35	5	23		58	63	+ 5
Three-and-a-half-order lights		2					1		3	1	4						3		8		11	11	
Fourth-order lights	20	23	47	13	44	4	6	13	35	24	36	10	8				170	18	95		277	283	+ 6
Fifth-order lights	26	16	21	8	24	4	1	14	15	13	16	5	2				114	7	44		158	165	+ 7
Sixth-order lights	1	5	34	2	8	5	1	2	20	17	13						58		50		107	108	+ 1
Lens lanterns	8	1	10	9	19	15	14	23	15	20	46	6	12				99	18	81		197	198	+ 1
Range lenses			6	8	2												16				16	16	
Reflectors	2	11		8	4	22		2	1	1							49		2		48	51	+ 3
Post lanterns	6	10	147	11	53	132	27	39	15		94	13	105	523	513	360	425	118	109	1,396	2,020	2,048	+ 28
Light-vessels in position		10	8	5	3	3		2	4	3	3	1	2				31	3	10		45	44	− 1
Electric-lighted buoys			11														11				11	11	
Gas-lighted buoys		7	12	2	3			4	9	23	22						28		54		67	82	+ 15
Total lighted aids	77	96	315	74	167	197	64	110	127	107	245	48	140	523	513	360	1,100	188	479	1,396	3,097	3,163	+ 66
Fog-signals operated by steam, hot-air, or other engines	13	12	27	7	5	2		1	34	9	31	16	15				67	31	74		160	172	+ 12
Fog-signals operated by clockwork	27	11	61	7	65	3		15	7	6	5	10	4				189	14	18		217	221	+ 4
Day beacons	113	72	47	3	11	40	54	52			1	51	48	4			382	99	1	4	475	496	+ 21
Whistling buoys	14	12	5	3	1	7	3	5				15	8				50	23			70	73	+ 3
Bell buoys	20	21	28	6	5	11	6	3	1		3	11	5				100	16	4		117	120	+ 3
Other buoys	690	542	570	153	1,112	296	284	129	102	142	377	73	279				3,776	352	621		4,712	4,749	+ 37
Total unlighted aids	877	670	738	179	1,199	359	347	205	144	157	417	176	359	4			4,574	535	718	4	5,751	5,831	+ 80
Total number of aids	954	766	1,053	253	1,366	556	411	315	271	264	662	224	499	527	513	360	5,672	723	1,197	1,400	8,848	8,994	+146

Appropriations made at the first session of the Fifty-sixth Congress for the Light-House Establishment (act of June 6, 1900).

Supplies of light-houses	$475,000
Repairs of light-houses	640,000
Salaries of light-keepers	775,000
Expenses of light-vessels	450,000
Expenses of buoyage	550,000
Expenses of fog-signals	150,000
Lighting of rivers	300,000
Survey of light-house sites	1,000
Oil houses for light-stations	10,000

SPECIAL WORKS.

First district.

Cape Elizabeth, Maine, light-vessel (additional)	20,000
Narragaugus light-station, Maine	150
Kennebec River lights boathouses, Maine	1,620
Rockland Breakwater, Maine	30,000

Second district.

Long Island Head, Massachusetts	4,500
Eastern Point, Massachusetts	500
Pollock Rip, Massachusetts	5,000

Third district.

Tender for the inspector, Third light-house district	62,500
Staten Island depot, New York	25,000
Porto Rican light-house establishment	60,000

Fourth district.

Delaware Breakwater, harbor of refuge	30,000

Fifth district.

Tender for the Fifth light-house district	20,000

Seventh district.

Cape San Blas, Florida	15,000

Eighth district.

Sabine Bank, Texas	40,000

Ninth district.

Michigan City, Ind	5,500
Tender for the engineer, Ninth light-house district	50,000

Tenth district.

Buffalo Breakwater, New York	45,000
Detroit River, Michigan	1,000

Eleventh district.

Grosse Pointe, Michigan, light-vessel (reappropriated)	15,000
Head of St. Marys River, Michigan	2,700

Twelfth district.

Point Pinos, California	2,000
Cape Mendocino, California	1,000

Thirteenth district.

Browns Point, Washington	$6,000
Desdemona Sands, Oregon (reappropriated)	11,000
Desdemona Sands, Oregon (additional)	24,000
Slip Point, Washington	12,500
Tongue Point, Oregon	5,000
Alaskan waters, light-house and fog-signal stations	100,000

Sixteenth district.

Tender for the Sixteenth light-house district	30,000

NEW WORKS AUTHORIZED.

Congress authorized, by act approved on February 15, 1893, the establishment of a number of light-stations at an aggregate cost of nearly half a million dollars, but made no appropriation at that time for their construction. Since then from time to time appropriation has been made for the erection of many of them. The following is a list of the light-stations remaining for which no appropriation has yet been made, with the maximum amount which each may cost:

Bay State Shoal lights, New York	$800
Fairport Harbor fog-signal, Ohio	4,300
Lorain Harbor (Black River) fog-signal, Ohio	4,300
Sand Hills light-house, Michigan	20,000
Bayfield light and fog-signal, Wisconsin	5,000
Pats (or Hat) Point light and fog-signal, Minnesota	15,000
Little Gull Island light and fog-signal, Michigan	20,000
Peshtigo Shoal, Green Bay, Wisconsin	10,000
Wilson Harbor light, New York	2,500
Big Oyster Bed Shoal light and fog-signal, New Jersey	25,000
Deer Point light, Florida	1,000
New York Slough light and fog-signal, California	10,000
Willamette River, Oregon, 25 beacon lights and buoys between Salem and Portland	5,000

Congress authorized, by the act approved on February 18, 1899, the establishment of a light-vessel on The Tail of the Horseshoe, Chesapeake Bay, but made no appropriation therefor.

NOTE.—Light-Vessel No. 71, already in the Service, was, on October 15, 1900, placed on The Tail of the Horseshoe, as authorized.

Congress authorized, by the act approved on June 6, 1900, the reestablishment of the range lights on the Delaware River known as Finns Point range, Reedy Island range, and Port Penn range, at a cost not exceeding $90,000, but made no appropriation therefor.

Congress also, by act approved June 6, 1900, authorized the Secretary of the Treasury to enter into a contract for rebuilding the Sand Island light and fog-signal station, Alabama, at a total cost not to exceed $65,000, at any time he may consider such rebuilding to be necessary because of threatened destruction of the present station by the encroachment of the sea, but made no appropriation therefor.

A detailed statement of the work done in each of the sixteen light-house districts is made in the body of the report under specified headings.

SUPPLIES OF LIGHT-HOUSES.

The Board estimates that $475,000 will be needed for providing supplies for light-houses during the coming fiscal year, and it recommends that an appropriation of this amount be made therefor.

REPAIRS, ETC., OF LIGHT-HOUSES.

As stated last year, a large annual expenditure for repairs will be needed until the older light-house stations have been brought up to the standard of modern requirements. Restoration, repair, and improvement of light-house towers and structures and of illuminating apparatus; the substitution of new for old types of lamps, and of improved methods of rotation for the old devices in the case of flashing lights are required, as the old wear out or become inefficient under changed conditions. At many of the older stations the light-house structures and the auxiliary buildings for the occupation and use of the keepers are not only dilapidated but out of date, and require practical reconstruction. It was the early practice of the Light-House Board to provide for the family of the principal keeper and encourage employment of assistant keepers without families. This practice is no longer considered advisable, since keepers are best obtained by promotion of assistant keepers, and the latter should be encouraged to remain long in the service in order to qualify themselves for the position of keeper. At some stations where a single keeper was originally sufficient and was alone provided for, assistants have been made necessary by increase of duties, due to the introduction of fog-signals or other improvements in the station. In such cases there is crowding and discomfort for the families of the employees, and a lack of the privacy and comforts of domestic life which must be provided for a desirable class of employees.

It is proposed to effect the necessary improvements in the older stations progressively by a moderate annual expenditure.

It is estimated that $700,000 will be required during the fiscal year to end June 30, 1902, and it is recommended that an appropriation of that amount be made therefor.

SALARIES OF LIGHT-HOUSE KEEPERS.

On June 6, 1900, Congress appropriated $775,000 for salaries, fuel, rations, rent of quarters where necessary, and similar incidental expenses of not exceeding 1,475 light-house and fog-signal keepers and laborers attending other lights, for the fiscal year ending on June 30, 1901. Ten new light-stations have been completed during the past fiscal year. There are now in process of construction about 32 other stations, some of which will be finished and ready for lighting during the current fiscal year. It is reasonable to suppose that Congress will make appropriations for additional light-houses, which the Board has recommended should be built. The Board has recommended the establishment of a number of fog-signals at numerous existing stations, and it is probable that the number will be increased at the next session of Congress. It will be necessary to employ another keeper at each station to which a fog-signal is added. The Board therefore recommends that it be authorized to employ not exceeding 1,600 light-house and fog-signal keepers and laborers attending other lights, if needed, and that an appropriation of $800,000 be made therefor.

EXPENSES OF LIGHT-VESSELS.

Congress appropriated $450,000 to defray the expenses of light-vessels during the fiscal year to end on June 30, 1901. The appropriation will barely meet the needs of the service during that time.

There are now 44 light-vessels on stations and 9 light-vessels held in reserve ready in case of need to be put on stations to take the place of those for the time being under repair. Three light-vessels are being built. The Board has asked that appropriations be made for building 5 more. It costs about $6,000 a year to maintain a first-class light-vessel. The wear and tear on the older light-vessels increases with their age, and it costs more each year to keep them in repair. While the new light-vessels, when built, are fitted with all the modern improvements, the Board is fitting certain of the older light-vessels with fog-signals and like improvements to bring them up to its present standard. The cost of labor and material is largely increased since last year. The Board estimates, therefore, the expenses of light-vessels for the ensuing fiscal year will be at least $475,000, and it is recommended that an appropriation of that amount be made therefor.

EXPENSES OF BUOYAGE.

Congress appropriated $550,000 to defray the expenses of buoyage during the fiscal year to end on June 30, 1901. It is estimated that the same amount will be required to defray the expenses of buoyage during the coming fiscal year. The Board therefore recommends that an appropriation of $550,000 be made for this purpose.

FOG-SIGNALS.

As stated last year, the limited appropriation for this purpose has not permitted the general renovation and improvements that are so much needed in this important class of aids to navigation, though considerable progress has been made. Improved apparatus has been installed at several stations, preserving the system of interchangeability between the various members of the duplicate sets of apparatus required in each case. The Board is of the opinion that the change from the old-style steam engine, which consumes a great deal of steam, to the Crosby automatic engine, which operates by clockwork and consumes steam only for winding the clock and opening the valve, is desirable and should be made, at least as rapidly as the old engines become unserviceable; that the replacing of steam boilers by some form of explosive engine with an air compressor is desirable for all stations where the water supply is precarious, and may perhaps be found advantageous by experience in all cases when the present installation of steam boilers becomes unserviceable; that in view of the probability that steam will be replaced by compressed air quite generally for fog-signals, it is not desirable to enter at once upon any considerable expenditure for perfecting the installation of steam boilers.

The increased demand for this class of aids to navigation, considered in some localities of more importance than lights, and the necessity for extensive repair and renewal, demand a liberal appropriation.

It is estimated that $175,000 will be required for all expenses connected with fog-signals, and it is recommended that an appropriation of that amount be made therefor.

LIGHTING OF RIVERS.

The appropriations of $300,000, made by the acts approved March 3, 1899, and June 6, 1900, were barely sufficient to maintain the post

lights which had already been established, and they were insufficient to enable the Board to establish and maintain other lights, which it is evident are much needed. It is estimated that $325,000 will be needed to defray the expenses of lighting rivers during the next fiscal year, and it is recommended that an appropriation of this amount be made therefor.

NEW LIGHT-STATIONS AND DEPOTS.

Estimates for special appropriations for new light-stations and depots have been revised with particular care to bring them up to date, and make them conform to the actual needs of navigation in the various districts throughout the coasts and inland waters.

The Board desires to commend especially as a much-needed aid to navigation, the establishment of a first-order light at Hillsboro Inlet, to complete the system of lighting on the South Atlantic coast by filling the long gap which now exists between Jupiter Inlet and Fowey Rocks.

NEW LIGHT-VESSELS.

The Board has recommended in the proper places in the body of this report that appropriations be made for building a light-vessel for Cape Lookout Shoals, North Carolina; a relief light-vessel to be used for both districts on the Pacific coast; a small, inexpensive light-vessel for Peshtigo Reef, Green Bay, Lake Michigan; a steel steam light-vessel for Martins Reef, Lake Huron; and a steam light-vessel, with all modern improvements, for use at Blunts Reef, off Cape Mendocino, on the Pacific coast. Each is much needed, but attention is especially invited to the urgent necessity for the relief light-vessel.

NEW TENDERS.

The Board has recommended that appropriations be made for building 6 new tenders, and also that further appropriations be made for 4 tenders for which partial appropriations have already been made. It was recommended in the Board's last two annual reports that a steam tender be built for use in engineering and construction work in the Seventh light-house district, with headquarters at Mobile, Ala., and one for use in engineering and construction work in the Twelfth light-house district, with headquarters at San Francisco, Cal. In its last three annual reports the Board recommended that a steam tender be built for the use of the inspector of the Tenth light-house district. These recommendations are renewed. The old wooden sailing vessel, which has been used for works of construction and repair in the Seventh light-house district, has been condemned and sold.

The appropriation made by the act approved March 3, 1899, for a tender for the inspector of the Ninth light-house district, has been found insufficient to complete the vessel, owing to the increase in the cost of labor and material in metal shipbuilding, and an additional appropriation is urgently recommended.

Partial appropriations were made for tenders for the inspector of the Third light-house district, for the engineer of the Ninth light-house district, and for the inspector of the Sixteenth light-house district, by the act approved June 6, 1900. Further appropriations will be needed to satisfy the contracts authorized by the same act. By the act approved March 3, 1899, an appropriation was made for a large, powerful, seagoing tender for use in the Thirteenth light-house district; the amount being found insufficient, Congress, by the act

approved June 6, 1900, authorized contract in excess of the appropriation; an appropriation to satisfy this contract is now needed.

In addition to these the Board now recommends that an appropriation be made for a new steam tender for buoyage, supply, and inspection in the Eighth light-house district to take the place of the tender *Pansy*, which is old and worn-out. It is also recommended that a small steel steamer be provided to attend the lights in Mobile Ship Channel, Alabama. For several years it has been necessary to charter tugs to care for the lights, and it is deemed that it will be in the interests, not only of commerce and navigation, but of economy, if the recommendation of the Board is carried out.

The Board also recommends the construction of a steam tender for use in St. Marys River, Michigan. In consequence of the increased commerce passing through this river and the great necessity of keeping its aids to navigation in the best possible condition, an iron steamer drawing not more than 6 feet of water and a specially strengthened bow for ice crushing is required.

OIL HOUSES FOR LIGHT-STATIONS.

Under this appropriation oil houses have been completed during the year at the following-named stations:

Second district.—Lovells Island light-house depot, Massachusetts; Cape Cod, Massachusetts.

Third district.—Bullock Point, Rhode Island; Greenport Harbor beacon, New York.

Fourth district.—Maurice River range lights, New Jersey; Reedy Island range, front, Delaware.

Seventh district.—Charlotte Harbor, Florida.

Eighth district.—Fort Point, Texas; Point Isabel, Texas.

Ninth district.—Grossepoint, Illinois; Sturgeon Bay Canal, Wisconsin; Eagle Bluff, Wisconsin.

Twelfth district.—Point Pinos, California; Humboldt Bay, California.

An appropriation of $15,000 is recommended for continuing the work of erecting oil houses during the fiscal year 1902; and if the amount is made available, the work of providing these houses at established stations where they are required can be brought well along toward completion. This work has been in progress for a number of years, and it would be conducive to economy to provide at once for its completion. All new stations are provided with oil houses under the special appropriation for each station, and further appropriations for oil houses will not be required after the older stations have been provided for. Oil houses are needed for such storage of oil at points remote from the light-house structures as will minimize the danger of destruction of the buildings by fire.

DEPOTS AND SHOPS.

There are now maintained a total of 36 depots in the 13 sea and lake coast districts. Two more, one in the Ninth and one in the Eleventh district, will soon be completed. While all these depots are available for the general purposes of the service, a considerable number of them are more especially designed for the storage, repair, and painting of buoys, and other work incident to this branch of the service. The Board has now to recommend that an additional depot be estab-

lished in the Ninth district, at Milwaukee, Wis. This is needed for storage of material for construction and repair and for use of tenders.

In addition to the shops at the Staten Island depot in the Third district, known as the general light-house depot, all the districts, except the Twelfth, are now provided with machinists and shops, with an outfit of tools and machinery more or less complete, so that ordinary repairs to illuminating apparatus and fog-signal machinery may be made within the limits of the district and under the supervision of the local officers. The establishment at Staten Island is maintained as a general supply, manufacturing, and repair depot, but with the expansion of the service and the improving local facilities for purchasing and distributing supplies and making repairs the necessity for centralizing the minor operations at a general depot is constantly growing less, and the policy is adopted of making each district independent, as far as practicable, by placing the work of supplying stations and keeping the apparatus in order in the hands of the local officers of each district. The central depot at Staten Island will still remain the depot for investigation and experiment and for the purchase and manufacture in quantity of articles of general use.

THE CIVIL SERVICE.

The Board is pleased to state that it has been able to conform its practice to the rules of the Civil Service Commission, and that they have continued to work satisfactorily during the past fiscal year.

NEWLY ACQUIRED POSSESSIONS.

Since May 1, 1899, the Porto Rican light-house service has been under the charge of the Light-House Board. Congress, by the act approved June 6, 1900, appropriated $60,000 to maintain existing aids to navigation and complete the construction of Mona light, on Porto Rico, and those on adjacent islands. It is now estimated that $75,000 will be required to maintain aids to navigation in Porto Rican waters for the fiscal year to end June 30, 1902, and it is recommended that an appropriation of that amount be made therefor.

It is also recommended that $25,000 be appropriated to maintain the Hawaiian light-house establishment in case it should be turned over to the Light-House Board.

ALASKAN WATERS.

In view of the great extent of navigable waters in Alaska and of the increased traffic in this region, particularly between Puget Sound points and those along Lynn Canal, it seems so desirable that the present Thirteenth district should be divided, making two districts of it, that special recommendation will be made to Congress at its next session to that end, the new district to include Alaskan waters only, with headquarters at Sitka.

An examination is being made of the localities selected for light and fog-signal stations in Alaskan waters with reference to the exact locality for sites, and to form estimates of the cost of establishing, etc.

Congress, by the act approved March 3, 1899, appropriated $100,000 for the construction of a new tender for use in these waters. This amount being found insufficient, Congress, by the act approved June

6, 1900, authorized the Secretary of the Treasury to enter into contract for the construction of this tender at a total cost not exceeding $120,000. Plans and specifications have been prepared and contract will soon be made.

WIRELESS TELEGRAPHY.

The Board has continued to watch with interest the development of the use of the wireless telegraph during the year, and hopes that it may be able soon to install the apparatus, so that communication may be maintained between some of the light-vessels and the shore in the interests of the Light-House Service.

The Board proposes, with the consent of Congress, to establish either wireless telegraphy or telephony, or both, between certain light-vessels and certain light-houses, as may be found most desirable, and it estimates that $25,000 can be very judiciously expended therefor during the coming year, and therefore recommends that an appropriation of this amount be made.

INCREASED ACCOMMODATIONS FOR THE OFFICES OF THE LIGHT-HOUSE BOARD.

The following recommendation made in the Board's last three annual reports is renewed:

In previous years recommendation has been made and several times repeated that an appropriation be granted for a separate building for the offices of the Board. Separate buildings have been provided for a number of bureaus of the Treasury and other Departments whose requirements in this respect are certainly not greater than those of the Light-House Establishment.

The urgent demands for sufficient funds to maintain the direct aids to navigation and the conditions necessitating that appropriations be limited to the lowest possible figures have resulted in omitting the recommendation for a new building for the past few years. The business of the Board's office has, however, continued to increase, and the crowded condition and general inadequacy of the rooms now occupied, which are scattered about in various localities in the Treasury Department building, now require that the recommendation for proper office accommodations be renewed and in still more urgent terms. If an appropriation for this purpose be not deemed expedient, possibly a suitable building could be rented, or a building already owned by the Government might be made available for the purpose. An additional advantage would result from procuring necessary accommodations for the Light-House Board elsewhere in relieving to some extent the pressure for increased office room for other bureaus in the Treasury building.

INCREASE OF CLERICAL FORCE.

Appropriation was made by Congress at its last session to provide an additional clerk to be paid at the rate of $840 a year. Recommendation is now made that an additional clerk be provided for at $720 a year. The recommendations of last year in regard to certain increase in salaries are renewed.

HEATERS.

The average time of getting up steam with the old style of boilers is about forty-five minutes. With heaters kept properly tended this time can be greatly reduced with a small expenditure of coal. The importance of raising steam quickly is such that it is proposed that heaters be attached to all fog-signals operated by steam.

AWARDS TO LIGHT-KEEPERS.

By the act approved March 28, 1900, Congress authorized that C. R. Dobbins, keeper of the light-station at Moose Peak, Maine, accept a gold watch awarded to him by the government of the Dominion of Canada, in recognition of his humane and gallant services to the shipwrecked crew of the British schooner *Ashton*, of Weymouth, Nova Scotia.

By another act approved March 28, 1900, Congress authorized that C. E. Marr and E. H. Pierce, keepers of the Cuckolds, Maine, fog-signal station, accept each a silver watch awarded to them, respectively, by the government of the Dominion of Canada, in recognition of their services in rescuing the captain and crew of the schooner *Aurora*, of Harboursville, Nova Scotia, on January 4, 1896.

The watches were forwarded to the State Department by the British Government, which transmitted them through the Treasury Department to the Light-House Board, by which they were delivered through the inspector of the First light-house district to the specified light-keepers, and their receipts for the watches were transmitted to the government of the Dominion of Canada through the same channels.

ESTIMATES FOR GENERAL APPROPRIATIONS.

Supplies of light-houses	$475,000.00
Repairs of light-houses	700,000.00
Salaries of light-keepers	800,000.00
Expenses of light-vessels	475,000.00
Expenses of buoyage	550,000.00
Expenses of fog-signals	175,000.00
Lighting of rivers	325,000.00
Survey of light-house sites	1,000.00
Oil houses for light-stations	15,000.00
Porto Rican light-house service	75,000.00
Hawaiian light-house establishment	25,000.00
Light-house and fog-signal stations in Alaskan waters	400,000.00
Wireless electrical communication	25,000.00

ESTIMATES FOR SPECIAL APPROPRIATIONS.

FIRST DISTRICT.

Boon Island light-station, Maine, keeper's dwelling	$3,400.00
Little River Head fog-signal, Maine	12,500.00
Burnt Coat Harbor light-station, Maine, roadway	500.00
Isles of Shoals light-station, New Hampshire, fog-signal	5,500.00
Buckle Island light and fog-signal station, Maine	14,000.00
Moose Peak light-station, Maine, keeper's double dwelling	6,000.00

SECOND DISTRICT.

Castle Island buoy depot, Massachusetts	25,000.00
Minots Ledge light-station, Massachusetts, keepers' dwellings	5,500.00
Race Point light-station, Massachusetts, keepers' dwellings	2,800.00
State Ledge light and fog-signal station, Massachusetts	42,000.00

THIRD DISTRICT.

Black Ledge light and fog-signal station, Connecticut	60,000.00
Plum Beach light-station, Rhode Island, fog-signal	1,343.00
Fort Wadsworth light and fog-signal station, New York	12,900.00
Jeffreys Hook light and fog-signal station, New York, enlarging	1,400.00
Iona Island fog-signal station, New York	1,200.00
Pecks Ledge light and fog-signal station, Connecticut	10,000.00
Long Beach beacon-light station, Connecticut	2,500.00

Norwalk Harbor lighted beacons, Connecticut	$400.00
Waackaack Range beacon, New Jersey, keeper's dwelling	3,500.00
Tender for the inspector of the Third light-house district, completing	62,500.00
Staten Island light-house depot, New York	50,000.00

FOURTH DISTRICT.

Port Penn Range, Reedy Island Range, Finns Point Range, Delaware River, New Jersey, reestablishment	90,000.00
Grubbs Landing, Delaware River, Delaware, lighted beacon	8,000.00
Elbow of Cross Ledge, Delaware Bay, New Jersey, gas-lighted beacon	60,000.00
Edgemoor light-house depot, Delaware, keeper's dwelling, etc	6,000.00
Cape May light-station, New Jersey, keeper's dwelling	4,000.00

FIFTH DISTRICT.

Point No Point light-station, Maryland	70,000.00
Baltimore light and fog-signal station, Maryland, additional	60,000.00
Ragged Point light and fog-signal station, Virginia	20,000.00
Northwest Point Royal Shoal light station, North Carolina, rebuilding on a safer site	30,000.00
Bodie Island light-station, North Carolina, keeper's dwelling	7,500.00
Fort Washington light-station, Potomac River, Maryland, new tower	1,600.00
Chester River range lights, Maryland	3,000.00
Cape Lookout light-station, North Carolina, keeper's dwelling	7,500.00
Cape Lookout Shoals light-vessel, North Carolina	90,000.00
Lazaretto Point light-house depot, Maryland, keeper's dwelling	2,500.00
Washington, D. C., rebuilding light-house wharf	60,000.00

SIXTH DISTRICT.

Cape Fear light-station, North Carolina, completing	35,000.03
Cape Fear River range lights, North Carolina	3,105.00
Inside Passage beacon lights, Georgia and Florida	4,000.00
Sapelo light-station, Georgia, tower and dwelling	40,000.00
Reimbursement of losses of light-keepers in Sixth district	2.899.10

SEVENTH DISTRICT.

Hillsboro Inlet light-station, Florida	90,000.00
Tender for the engineer Seventh light-house district	85,000.00
Reimbursement of losses of light-keeper in Seventh light-house district	124.75
Reimbursement of losses of assistant light-keeper in Seventh light-house district	75.00

EIGHTH DISTRICT.

Sabine Bank light and fog-signal station, Texas, completing	40,000.00
Sabine Pass Jetty light and fog-signal station, Louisiana and Texas	40,000.00
Cubits Gap fog-signal station, Louisiana, keeper's dwelling	2,500.00
Oyster Bayou light-station, Louisiana	5,000.00
Tender for the inspector Eighth light-house district	125,000.00
Steamer for Mobile Ship Channel	40,000.00
Reimbursement of losses of light-keeper's in the Eighth light-house district	2,603.62

NINTH DISTRICT.

Milwaukee Breakwater and Harbor of Refuge, Wisconsin, light and fog-signal	75,000.00
Fishermans Shoal light and fog-signal station, Wisconsin	75,000.00
Pointe aux Barques light and fog-signal station, Michigan	32,000.00
Portage Lake light-station, Michigan, keeper's dwelling	3,500.00
Kewaunee light and fog-signal station, Wisconsin, keeper's double dwelling	7,500.00
Calumet Pierhead light-station, Illinois, keeper's dwelling	Authority.
Holland Pierhead Range, Michigan, fog-signal	6,000.00
St. Martin Island light and fog-signal station, Michigan, additional	14,000.00

Little Gull Island light and fog-signal station, Michigan	$20,000.00
Peshtigo Reef light-vessel, Green Bay, Wisconsin	15,000.00
Tender for the inspector Ninth light-house district, completing	30,000.00
Tender for the engineer Ninth light-house district, increasing the limit of cost	Authority.
Depot for the Ninth light-house district	50,000.00

TENTH DISTRICT.

Chapman Shoal light and fog-signal station, St. Lawrence River, New York	25,000.00
Oak Point, St. Lawrence River, New York, range lights and keeper's dwelling	10,000.00
Tibbetts Point, St. Lawrence River, New York, keeper's dwelling	3,500.00
Fort Niagara, New York, small light at mouth of river	2,000.00
Toledo Harbor light and fog-signal station, Ohio, completing	62,500.00
Port Clinton light-station, Ohio, keeper's dwelling	3,000.00
Grassy Island Range (Ecorse) light-station, Michigan, keeper's dwelling	5,000.00
Grosse Isle South Channel Range light-station, Michigan, keeper's dwelling	5,000.00
Grosse Isle North Channel Range light-station, Michigan, keeper's dwelling	3,500.00
Tender for the Tenth light-house district	120,000.00

ELEVENTH DISTRICT.

Middle Island light and fog-signal station, Michigan	25,000.00
Crisps Point light and fog-signal station, Michigan	18,000.00
Rock of Ages light and fog-signal station, Michigan	125,000.00
Eagle River light-station, Michigan, moving to Sand Hills	25,000.00
Isle aux Peches Range, Michigan, additional lights	12,000.00
Tawas light-station, Michigan, keeper's dwelling	5,000.00
Martins Reef light-vessel, Lake Huron	35,000.00
Tender for St. Marys River, Michigan	60,000.00

TWELFTH DISTRICT.

Point Buchon light and fog-signal station, California	40,000.00
Santa Barbara light-station, California, keeper's dwelling and tower	7,500.00
Point Sur light-station, California, keeper's dwelling	6,000.00
Pigeon Point light-station, California, site	5,000.00
Quarry Point fog-signal station, California	6,000.00
Fort Winfield Scott fog-signal, California	7,000.00
Cape Mendocino light-station, California, keeper's dwelling	5,500.00
Humboldt Bay, California, fog-signal	15,000.00
Yerba Buena Island, California, oil house	8,000.00
Relief light-vessel for the Twelfth and Thirteenth light-house districts, Pacific coast	90,000.00
Blunts Reef light-vessel, Pacific Ocean, off Cape Mendocino, California	90,000.00
Tender for the engineer Twelfth light-house district	125,000.00

THIRTEENTH DISTRICT.

Admiralty Head light-station, Washington, removal and reconstruction of buildings, additional	12,000.00
Battery Point light and fog-signal station, Puget Sound, Washington, fog-bell with suitable dwelling, including site	6,000.00
New Dungeness light-station, Washington, keeper's dwelling	4,500.00
Cape Blanco light-station, Oregon, keeper's dwelling	4,500.00
Robinson Point light-station, Washington, keeper's dwelling	4,000.00
Burrows Island light and fog-signal station, Washington	15,000.00
Semiahmoo light and fog-signal station, Washington	25,000.00
Yaquina Head light-station, Oregon, keeper's dwelling	4,000.00
Tender for the Thirteenth light-house district, completing	20,000.00
Tongue Point light-house depot, Oregon, engineer's storehouse	4,000.00

SIXTEENTH DISTRICT.

Tender for the inspector Sixteenth light-house district, completing	30,000.00

FIRST DISTRICT.

This district extends from the head of navigation on the St. Croi River, Maine, the northeastern boundary of the United States, to an including Hampton Harbor, New Hampshire. It embraces all aids t navigation on the seacoast of Maine and New Hampshire and on al tidal waters between the limits named.

Inspector.—Commander James K. Cogswell, United States Navy.

Engineer.—Maj. (now Lieut. Col.) William S. Stanton, Corps of En gineers, United States Army.

In this district there are—

Light-houses and beacon lights	7
Day or unlighted beacons	11
Fog-signals operated by steam, caloric, or oil engines	1
Fog-signals operated by clockwork	2
Whistling buoys in position	1
Bell buoys in position	2
Other buoys in position	69
Steamer *Lilac*, buoy tender, and for supply and inspection	1
Steamer *Myrtle*, for construction and repair in the First and Second districts	1
Steamer *Geranium*, buoy tender, and for supply and inspection	1

NOTE.—The number preceding the name of a light-station in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, and Eighth districts is that by which it is designated in the List of Lights and Fog-Signals on the Atlantic and Gulf coasts of the United States, corrected to June 30, 1900.

LIGHT-STATIONS.

4. West Quoddy Head, entrance to Quoddy Roads, Maine.—The boathouse was moved to the rear of the dwelling for use as a fuel and store house. The characteristic of the fog-signal was changed August 31, 1899. Various repairs were made.

5. Little River, on Little River Island, at the mouth of Little River (Cutler) Harbor, Maine.—About 300 feet of post and wire fence was built. Various repairs were made.

—. Little River Head, mouth of Little River Harbor, Maine.—The following recommendation was made in the Board's annual reports from 1889 to 1894, and from 1896 to 1899:

> This is the entrance to Cutler Harbor, which is a station of the Eastport, St. John, and Bay of Fundy pilots. Vessels entering the Bay of Fundy first make Libby Islands and then try to make Little River light. It is a harbor of refuge, and is used as such by vessels when they can get in. This, however, is impossible in thick weather without a more effective fog-signal than the bell now on Little River Island. The steamer *Eduardo* was wrecked on Old Man Island in 1889, 2 miles south of Cutler Harbor, and proved a total loss. The crew, numbering 40 in all, were saved. She cost $285,000, and her master stated formally that he was of opinion that the accident would not have occurred had there been a proper fog-signal at this point.
>
> The Board recommended the establishment of a fog-signal there in six annual reports. It is estimated that the establishment of such a signal would cost $10,500, and an appropriation of that amount is therefore recommended.

This estimate which was made eleven years ago is no longer correct, owing to the increase in the cost of labor and material. It is now

estimated that it will cost $12,500 to establish this fog-signal, and the Board recommends that an appropriation of this amount be asked therefor.

6. Avery Rock, in Machias Bay, Maine.—A dangerous rock was removed at the approach to the boat slip. A new striking machine was provided for the fog bell. Various repairs were made.

7. Libby Islands, entrance to Machias Bay, Maine.—A brick service room was built at the tower, a cellar was made under the keeper's dwelling, 70 feet of sink drain and 75 running feet of plank walk were laid, the boat slip was repaired, a timber bulkhead was rebuilt for its protection, and 1,000 square feet of landing platform was built of plank at the boathouse. The characteristic of the fog-signal was changed October 1, 1899. Various repairs were made.

8. Moose Peak, on Mistake Island, seacoast of Maine.—The following recommendation, made in the Board's last annual report, is renewed:

The dwelling occupied by the keeper and assistant keeper is old, in very poor condition, and is past economical repair. The Board proposes to replace it with a new double dwelling. It is estimated that this can be done for not exceeding $6,000, and the Board recommends that an appropriation of this amount be made therefor.

11. Narraguagus, entrance to Narraguagus Bay, Maine.—An appropriation of $150 was made by the act approved June 6, 1900, for purchase of land for a boat slip. Measures are in progress to acquire it. Minor repairs were made.

12. Petit Manan, on Petit Manan Island, Maine.—The light-tower was repointed, the boathouse was enlarged, and a new suction pipe provided for the fog-signal pump. Various repairs were made.

13. Prospect Harbor, on the eastern side of the entrance to the harbor, Maine.—A new boat winch was furnished. Various repairs were made.

15. Mount Desert, on Mount Desert Rock, Atlantic Ocean, about 20 miles to southeast of Mount Desert Island, Maine.—The antiquated and worn-out engines with compressors for the fog-signal were replaced by oil engines with compressors reducing the time between ignition and the first blast of the signal to 10 minutes, which with the old plant took about an hour. The characteristic of the fog-signal was changed. A new storm porch was built on to the assistant keeper's house. Various repairs were made.

16. Egg Rock, Frenchman Bay, Maine.—The boathouse which was carried away by the storms of March, 1900, was rebuilt, 20 feet of new boat slip made, and the tower deck was repointed.

19. Great Duck Island, Atlantic Ocean, Maine.—Some 700 running feet of plank walk was built. The characteristic of the fog-signal was changed. Various repairs were made.

21. Bass Harbor Head, east side of entrance to Bass Harbor, Maine.—The L of the dwelling was extended 10 feet, the boat slip was extensively repaired and improved and some rocks were removed from its approach. The entrance to the lantern, through the iron deck, was enlarged. Various repairs were made.

22. Burnt Coat Harbor, Swan Island, coast of Maine.—The dwelling was repaired and improved by rearrangement of its interior and 40 feet of sewer pipe laid. The old fuel house was repaired for use as a barn. Various repairs were made.

First District.

The following recommendation, made in the Board's last six annual reports, is renewed:

This station is situated at the extreme end of the peninsula and is separated from the town by the harbor. In winter the harbor is sometimes filled with ice, so that communication with the town by water can not be relied upon; a roadway for the accommodation of the necessary travel between the public road and the light-station is therefore necessary. The owners of the adjacent land offer to convey right of way to the Government at a nominal price. It is estimated that the legal expenses of obtaining title and cession of jurisdiction to the land thus conveyed, together with the cost of building the road needed, will not exceed $500. Recommendation is made that an appropriation of this amount be made therefor, since a specific appropriation is required for the purchase of land.

24. Saddleback Ledge, near Isle au Haut, Maine.—A new striking machine for the fog-bell was provided and installed. Various repairs were made.

—. *Buckle Island, entrance to York Narrows, Maine.*—The following recommendation, made in the last three and several previous annual reports of the Board, is renewed:

The Board is informed that something more than 1,000 sailing vessels, carrying lumber, fish, hay, coal, granite, and general merchandise, annually use this passage. There are also several lines of steamboats, some of which make two trips a day, carrying large numbers of passengers to and from Bar Harbor and other points along the shore, which would be benefited by lights on Buckle Island. In the early spring and late fall steamers, and especially sailing vessels, find it necessary to go through the passage during the night, when a light on Buckle Island would be of great assistance to them. It is further stated that several vessels have been cast away on Buckle Island, among them the schooner *Walter Scott*, which was wrecked in the winter of 1870. It is proposed, if the necessary appropriation is made, to place a white light with four red sectors, with a post range light 100 feet in front of the main light. It is estimated that these range lights can be established at a cost not exceeding $14,000, and it is recommended that an appropriation of this amount be made therefor.

30–31. Matinicus Rock, on Matinicus Rock, Atlantic Ocean, off the southern entrance to Penobscot Bay, Maine.—The fog-signal whistles were changed in position and placed directly over the domes of the boilers, the engines operating the characteristic valves were replaced by automatic clocks, and the chimney replaced by a much larger and taller one 36 feet high. The change much reduced the length of the steam pipes and the number of connections, simplified the apparatus, reducing cost of maintenance, and reducing the time between lighting the fire and the first blast of the whistle fully 50 per cent, from an hour or more to about 30 minutes. Two engines formerly used for the fog-signal characteristic were altered and installed for hoisting coal from the landing and delivering it in the fog-signal house. A stone dwelling built in 1847 was extensively repaired; the upper story was wholly and the lower story was partly rearranged, the fog-signal cistern was removed from its cellar and was replaced by a cistern of 7,000 gallons capacity in the fog-signal house. Various repairs were made. The dwelling occupied by two assistant keepers with their families was rearranged so as to entirely separate the families by giving them each a separate entrance, stairs and hall; an addition was built providing each family with a cellar containing a cistern and with a room for storage and fuel. About fifty feet of sewer pipe was laid.

33. Whitehead, entrance to Penobscot Bay, Maine.—With the appropriation of $3,400, made by the act approved March 3, 1899, the tem-

First District.

porary dwelling was converted into a permanent dwelling. An unsafe funnel in the storehouse was replaced by a brick chimney and the storehouse and roof of the fog-signal building were repaired. The boundary line of the light-house land was surveyed straight across the peninsula, marked by copper bolts in the rock, and recorded with plat in the registry of deeds at Rockland, Me. Various repairs were made.

35. Rockland Breakwater, entrance to Rockland Harbor, Maine.—The temporary beacon lights were moved to a point 650 feet nearer the end of the breakwater on November 20, 1899. An appropriation of $30,000 was made by the act approved June 6,1900, for the establishment of a station. Plans for the station are being prepared.

37. Indian Island, entrance to Rockport Harbor, Maine.—Some 130 feet of boat slip was built. Minor repairs were made.

38. Negro Island, on Negro Island, entrance to Camden Harbor, Maine.—The lower 30 feet of the boat slip was rebuilt and the fuel house was moved and repaired.

43. Marshall Point, entrance to Herring Gut or St. George Harbor, Maine.—A short covered way was built from the dwelling to the fuel house.

44. Monhegan Island, coast of Maine.—Some 1,122 feet of post and wire boundary fence was built and a new plank walk was laid at the keeper's dwelling. Various repairs were made.

45. Manana Island Fog-Signal Station, coast of Maine.—A 4-horse-power oil engine, with an air compressor, was installed in place of a worn-out caloric engine, thus completing the installation of oil engines with air compressors in duplicate. A cooling tank was built, the cistern repaired, and a ceiling made in the fog-signal house. The characteristic of the fog-signal was changed. Various repairs were made.

49. Burnt Island, entrance to Boothbay Harbor, Maine.—The entrance was enlarged, through the iron deck to the lantern, and minor repairs were made to bell tower and fence, and fog-bell machinery.

52. Pond Island, Kennebec River, Maine.—One end of the dwelling, which was decayed, was rebuilt and the interior of the dwelling was rearranged. The entrance, through the iron deck, to the lantern was enlarged, and a concrete floor was laid in the tower service room. The boat slip was improved and made accessible at low water. Various repairs were made.

53. Fort Popham Beacon, Kennebec River, Maine.—A fixed red lens lantern light was established on October 19, 1899.

54. Perkins Island, Kennebec River, Maine.—A white sector was placed in the lantern on July 10, 1899. The act approved June 6, 1900, appropriated $1,620 to be applied in part to the erection of a boathouse at this station. Plans for the work are being made.

55. Squirrel Point, Arrowsic Island, Kennebec River, Maine.—The act approved June 6, 1900, appropriated $1,620, to be applied in part to the erection of a boathouse at this station. Plans for the work are being made. Various repairs were made.

56, 57. Doubling Point Range, at lower end of Fiddlers Reach, Kennebec River, Maine.—The act approved June 6, 1900, appropriated $1,620, to be applied in part to the erection of a boathouse at this station. Plans for this work are being made. Various repairs were made.

First District.

58. Doubling Point, Kennebec River, Maine.—A foundation pier of stone masonry was built on the extreme point at the low-water line; the tower with the light and fog-bell was moved to it, and a footbridge 130 feet in length was built from the tower to the shore. The act approved June 6, 1900, appropriated $1,620, to be applied in part to the erection of a boathouse at this station. Plans for this work are being made. Various repairs were made.

62. Seguin, off the mouth of the Kennebec River, Maine.—A new steam drum was put on the fog-signal boiler, and a brick cistern of about 7,500 gallons capacity was built in the signal house. Various repairs were made.

65, 66. Cape Elizabeth, Maine.—In the fog-signal house the chimney was replaced by a much larger one, 40 feet high, and the roof of the fog-signal house and the reservoir were repaired. The three dwellings were connected with the three towers and the fog-signal house by 1,800 feet of telephone wire and 400 feet of cable. Various repairs were made.

67. Portland Head, entrance to Portland Harbor, Maine.—The rubble tower, built in 1790, was extensively repointed, and many of the stones were removed and replaced. Two 4-horsepower oil engines with air compressors were installed in place of two old caloric engines for the fog-signal, and a cooling tank was built. The station was connected by about 500 feet of pipe with the water system of Portland, Me. Various repairs were made.

72. Cape Neddick, on north part of York Nubble, Cape Neddick, Maine.—Some 40 feet were added to the boat slip and about 50 large bowlders removed from its approach, below low water. A storm porch was built at the tower. Various repairs were made.

73. Boon Island, seacoast of Maine.—The following recommendation, made in the Board's last nine annual reports, is renewed:

There are at this station one keeper and two assistants, and but two sets of quarters in one double dwelling. The second assistant keeper has to board either with the family of the keeper or with that of the first assistant keeper. This forced arrangement is unsatisfactory to all, and is quite unfavorable to the retention of a second assistant of the needed qualifications. The station is isolated and exposed, the tower is tall, and this second-order light is an important one.

A third dwelling, which is urgently needed, it is estimated can be built for $3,400. It is therefore recommended that an appropriation of this amount be made therefor.

74. Whaleback, entrance to Portsmouth Harbor, New Hampshire.—A 1½-horsepower oil engine with an air compressor was installed in place of a worn-out caloric engine, thus completing the installation of oil engines and air compressors in duplicate. A cooling tank was provided. Various repairs were made.

76, 77. Seavys Island, entrance to Portsmouth Harbor, New Hampshire.—An addition was made to the dwelling, providing four more rooms, a cellar, and a piazza.

80. Isles of Shoals, New Hampshire.—The following recommendation, made in the Board's last four annual reports, is renewed:

The fog-signal now on White Island at the Isles of Shoals light is a bell. It falls far short of being adequate to the needs of commerce. A more effective signal is required. It is estimated that this can be established here for $5,500, and it is recommended that an appropriation of this amount be made therefor.

First District.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

2. St. Croix River, Me.
3. Lubec Channel, Me.
8. Moose Peak, Me.
10. Nash Island, Me.
14. Winter Harbor, Me.
17. Crabtree Ledge, Me.
18. Baker Island, Me.
20. Bear Island, Me.
25. Deer Island Thorofare, Me.
26. Goose Rocks, Me.
28. Pumpkin Island, Me.
32. Two Bush Island, Me.
34. Owls Head, Me.
41. Fort Point, Me.
42. Tennant Harbor, Me.
46. Franklin Island, Me.
47. Pemaquid Point, Me.
48. Ram Island, Me.
50. Cuckolds Fog-Signal Station, Me.
51. Hendricks Head, Me.
61. Ames Ledge, Me.
64. Halfway Rock, Me.
68. Spring Point Ledge, Me.
70. Wood Island, Me.
71. Goat Island, Me.
73. Boon Island, Me.
75. Portsmouth Harbor, N. H.
78. Jerrys Point Beacon, N. H.
79. Frosts Point Beacon, N. H.
80. Isles of Shoals, N. H.

LIGHT-VESSELS.

Cape Elizabeth light-vessel, No. 74, Maine.—An appropriation of $70,000 was made by the act approved on March 3, 1899, for constructing a light-vessel with a fog-signal, to be placed near Cape Elizabeth, Maine. That amount being found insufficient for the purpose, an appropriation of $20,000 was made by the act approved June 6, 1900, in addition to the former appropriation. She is being built under a contract which requires that she be finished by May 15, 1901.

DAY OR UNLIGHTED BEACONS.

The following-named day or unlighted beacons were established during the fiscal year:

Long Ledge Beacon, Deer Island Thorofare, Maine, at the entrance to Deer Island Thorofare.—A white, triangular, pyramidal structure, 60 feet high and 30 feet wide on each side of its base, the upper half covered with horizontal slats, was established on December 1, 1899, on the southerly part of the ledge, which is bare at about half tide.

Crotch Island Ledge Beacon, East Penobscot Bay, Maine.—On June 25, 1900, there was completed, on Crotch Island Ledge, which is awash at low water, off the northwesterly side of Thurlows or Crotch Island, southeasterly side of Deer Island Thorofare, East Penobscot Bay, a pyramidal granite structure, 15 feet square at its base, 10 feet square at its top, and 20 feet high, surmounted by a black wooden spindle supporting a 4-foot, cubical, black, open-work cage, 22 feet above mean high water.

Halibut Rocks Beacon, Jericho Bay, Maine, in the southeasterly part of Jericho Bay, and about 1⅞ miles southwesterly from West Point, Swan Island.—A white, triangular, pyramidal structure, 65 feet high and 30 feet wide on each side of its base, covered with close boarding for a height of from 6 to 16 feet above the rock on the northerly and westerly (channel) faces, and with horizontal slats above and on the other face, was established on December 6, 1899, on the northerly of the 3 rocks, about 10 feet above high water.

First District.

Eastern Egg Rock, Penobscot Bay; Maine.—Repairs were made, and the tripod formerly black was painted white.

Ash Island, Penobscot Bay, Maine.—The color was changed from white and brown to white.

Odoms Ledge, Penobscot Bay, Maine.—The color was changed from black to white.

Otter Island, West Penobscot Bay, Maine.—The color was changed from red to white.

Shag Rock, entrance to Rockland Harbor, Maine.—The color was changed from black to white.

Thomaston Beacon, St. George River, Maine.—The beacon was rebuilt.

The Sisters Beacon, Sheepscot Bay, Maine, in the southwesterly part of Sheepscot Bay.—A white, triangular, pyramidal structure, 65 feet high and 30 feet wide on each side of its base, the upper half covered with horizontal slats, was established on December 1, 1899, about 10 feet above high water, on the easterly of the 3 ledges.

Shag Rock Beacon, Kennebec River, Maine, on the easterly side of the Kennebec River, about one-half mile above Fort Popham.—A red, triangular, pyramidal structure, 60 feet high and 30 feet wide on each side of its base, the upper half covered with horizontal slats, was established on October 23, 1899, on the rock, which is awash at high water.

Pettis Rocks Spindle, Kennebec River, Maine, the most southerly of the Pettis Rocks, Kennebec River.—A black spindle, 32 feet high, surmounted by a black cask, was erected December 4, 1899.

Ram Island, Kennebec River, Maine.—The color was changed from black to white.

Indian Point Beacon, Kennebec River, Maine, extreme southerly part of Indian Point, westerly side of the Kennebec River.—A white, triangular, pyramidal structure, 50 feet high and 30 feet wide on each side of its base, covered with horizontal slats, was established on October 6, 1899, at the water's edge on the rocks.

Bragdons Rock Spindle, New Meadows River, easterly side of New Meadows River, Casco Bay, Maine.—A red spindle, 32 feet high, surmounted by a red cask, was established on June 9, 1900, on Bragdons Rock.

Little Mark Island, Harpswell Harbor, Maine.—The beacon was whitewashed.

Andersons Ledge, Isles of Shoals, New Hampshire.—The cage on the spindle has been several times carried away by the sea. The height of the spindle was increased by a topmast of wrought iron and a new cage placed upon it.

FOG SIGNALS OPERATED BY STEAM, CALORIC, OR OIL ENGINES.

4. *West Quoddy Head, Maine.*—This 10-inch steam whistle, in duplicate, with blasts of 5 seconds separated by silent intervals of 15 seconds, was in operation some 463 hours during the year, and consumed about 24 tons of coal; with blasts of 3 seconds duration, separated by one silent interval of 7 seconds, and two silent intervals each of 22 seconds, was in operation some 618 hours during the year, and consumed about 39 tons of coal.

7. *Libby Islands, Maine.*—This 10-inch steam whistle, in duplicate,

First District.

with blasts of 5 seconds duration, separated by silent intervals of 25 seconds, was in operation some 656 hours during the year, and consumed about 32 tons of coal; with blasts of two seconds duration, separated by silent intervals of 13 seconds, was in operation some 596 hours during the year, and consumed about 53 tons of coal.

12. Pettit Manan, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 1,576 hours during the year, and consumed about 57 tons of coal.

15. Mount Desert, Maine.—This third-class Daboll trumpet, in duplicate, operated by caloric engines, was in operation some 749 hours during the year, and consumed about 2,166 pounds of coal; operated by a Hornsby Akroyd engine, was in operation some 748 hours during the year, and consumed about 216 gallons of oil.

19. Great Duck Island, Maine.—This 10-inch steam whistle, in duplicate, with blasts of 5 seconds, separated by alternate silent intervals of 18 and 32 seconds, was in operation some 706 hours during the year, and consumed about 30 tons of coal; with blasts of 5 seconds duration, separated by alternate silent intervals of 20 and 30 seconds, was in operation some 504 hours during the year, and consumed about 25 tons of coal.

30, 31. Matinicus Rock, Maine.—These signals are a 10-inch and a 12-inch steam whistle; the 10-inch whistle was in operation some 723 hours during the year, and consumed about 33 tons of coal; the 12-inch whistle was in operation some 340 hours during the year, and consumed about 23 tons of coal.

33. Whitehead, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 1,317 hours during the year, and consumed about 60 tons of coal.

45. Manana Island, Maine.—This first-class Daboll trumpet, in duplicate, operated by a caloric engine, was in operation some 363 hours during the year, and consumed about 4 tons of coal; operated by a Hornsby Akroyd engine, was in operation some 554 hours during the year, and consumed about 327 gallons of oil.

50. Cuckolds, Maine.—This Daboll trumpet, in duplicate, was in operation some 976 hours during the year, and consumed about 6 tons of coal.

62. Seguin, Maine.—This 10-inch steam whistle, in duplicate, was in operation some 998 hours during the year, and consumed about 63 tons of coal.

65, 66. Cape Elizabeth, Maine.—One second-class steam siren and one 12-inch steam whistle. The second-class siren was in operation some 814 hours during the year, and consumed about 31 tons of coal; the 12-inch steam whistle was in operation some 30 hours during the year, and consumed about 2 tons of coal.

67. Portland Head, Maine.—This second-class Daboll trumpet, in duplicate, operated by a caloric engine, was in operation some 428 hours during the year, and consumed about 5 tons of coal; operated by a Hornsby Akroyd engine, was in operation some 310 hours during the year, and consumed about 207 gallons of oil.

74. Whaleback, New Hampshire.—This third-class Daboll trumpet, in duplicate, operated by a caloric engine, was in operation some 95 hours during the year, and consumed about 700 pounds of coal; operated by a Hornsby Akroyd engine, was in operation some 674 hour during the year, and consumed about 210 gallons of oil.

First District.

BUOYAGE.

During the year there were established 1 bell and 7 spar buoys and 8 day or unlighted beacons. There are in this light-house district 14 whistling buoys and 20 bell buoys, all in good condition.

DEPOTS.

Bear Island, Mount Desert, Maine.—A length of about 30 feet by 40 feet of the wharf, damaged by the storm of March 2, 1900, was raised and securely fastened.

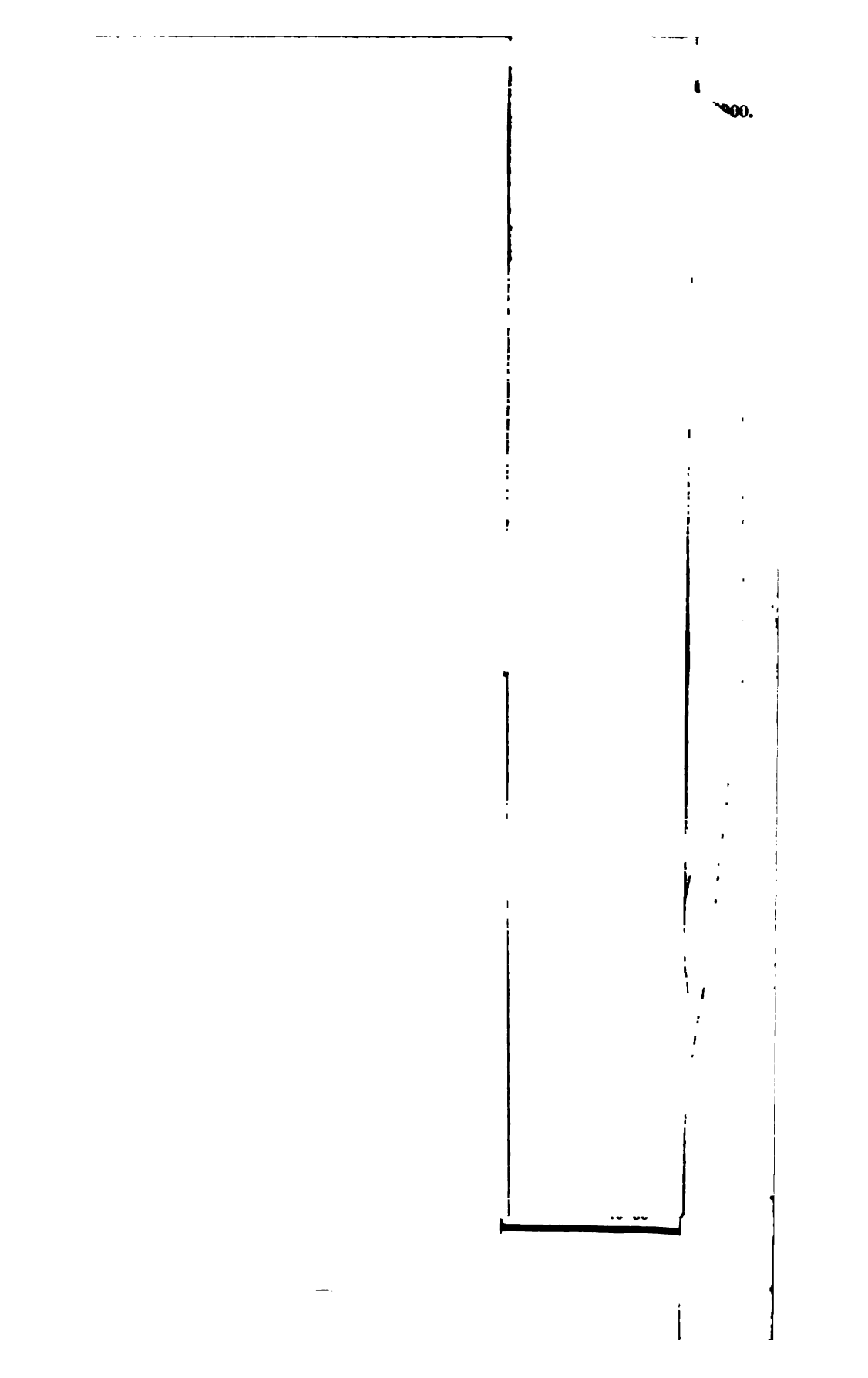
Whitehead, West Penobscot Bay, Maine.—The wharf at this station is in good condition.

TENDERS.

Lilac.—This steel screw steamer was built in 1892 and is of about 434 tons burden. She was employed throughout the year. She was hauled out in October, 1899, when her bottom was cleaned and painted and minor repairs made to her keel and shoe. During the year she was hauled off 49 days for repairs to her boilers and engines, exclusive of 4 days on the ways for cleaning and painting. She was employed from 15 to 20 days of each quarter landing coal, rations, and extra supplies at the different light and fog-signal stations. She was employed 11 days on the trial course of the U. S. battle ships *Kearsarge* and *Kentucky*. She was laid up for repairs 53 days. Besides, she was at the Bath Iron Works from May 22 to June 30, inclusive, to receive new boiler and fittings and for modifications of joiner work. She steamed 11,100 miles and consumed 904 tons of coal. She established 3 buoys, replaced 81 buoys, changed 90 buoys, painted 142 buoys and 1 spindle, landed 146 tons of coal at the different light and fog-signal stations, and did 44½ days' work at the light-house depot on buoys.

Geranium.—This wooden side-wheel steamer was built in 1863, and is of about 356 tons burden. She did good service in delivering coal and supplies, and painting, changing, and replacing buoys. From January 15, 1900, to March 20, 1900, she was laid up for the winter. She was hauled out in June, 1900, when her bottom was cleaned and painted and repairs made to her shoe. During the year she was hauled off 36 days for repairs to boiler and engine, exclusive of 2 days on the railway for extensive repairs to boiler and machinery. She was laid up for repairs 38 days. She steamed 5,846 miles and consumed 599 tons of coal. She established 5 buoys, replaced 58 buoys, changed 161 buoys, painted 118 buoys and 35 spindles and beacons, landed about 72 tons of coal at the different light and fog-signal stations, and did 56 days' work at the light-house depot on buoys.

Myrtle.—This steamer, being used for construction and repair work in both the First and Second light-house districts, will be described in the report of work done in the Second light-house district.



SECOND DISTRICT.

This district extends from Hampton Harbor, New Hampshire, to Elisha Ledge, off Warren Point, Rhode Island, but does not include either the harbor or the ledge. It embraces all aids to navigation on the seacoast and tide waters of Massachusetts, excepting those on the Taunton River and that part of Mount Hope Bay lying within the State boundary.

Inspector.—Commander J. R. Selfridge, United States Navy, to December 2, 1899; Commander, now Captain, Washburn Maynard, United States Navy, from December 12, 1899.

Engineer.—Now Lieut. Col. William S. Stanton, Corps of Engineers, United States Army.

In this district there are—

Light-houses and lighted beacons	79
Light-vessels in position	10
Light-vessels for relief	2
Day or unlighted beacons	72
Fog-signals operated by steam, caloric, or oil engines	12
Fog-signals operated by clockwork	11
Gas-lighted buoys in position	7
Whistling buoys in position	12
Bell buoys in position	20
Electric-bell buoy in position	1
Other buoys in position	542
Ice buoys for winter use	11
Steamers *Verbena*, *Mayflower*, and *Azalea*, buoy tenders and for supply and inspection	3
Steamer *Myrtle*, for construction and repair in the First and Second districts	1

LIGHT-STATIONS.

84–85. Newburyport Upper Harbor, Newburyport, Mass.—Some 80 running feet of close board boundary fence was built.

86–87. Ipswich, south side of entrance to Ipswich Harbor, Massachusetts.—The front beacon was moved to a new site to adapt the range to a change in the channel. The front beacon house was rebuilt, 375 running feet of plank walk was laid, and minor repairs were made to the dwelling.

89. Straitsmouth, on Straitsmouth Island, north side of Cape Ann, Massachusetts.—Some 120 running feet of stone and gravel walk was laid, the boathouse was moved and secured on stone piers, and minor repairs were made to the fuel house and footbridge leading to the tower.

90–91. Cape Ann, Thatcher Island, seacoast of Massachusetts.—The whistles were moved and placed directly over the domes of the boilers. The engines operating the characteristic valves were replaced by automatic clocks, and the chimney replaced by two taller steel stacks, much reducing the length of steam pipe and the number of joints, and improving the draft. A cistern of 6,000 gallons capacity was built in the fog-signal house. The engines formerly used with the characteristic valve were adapted to hauling coal from the landing to the fog-signal house and installed. Various repairs were made.

Second District.

92. Eastern Point, entrance to Gloucester Harbor, Massachusetts.—By the act approved June 6, 1900, $500 was appropriated for building a boathouse. Plans for doing this work are in hand. Various repairs were made.

101. Egg Rock, off Nahant, Mass.—The boat slip and stairs at the landing, with platform, were rebuilt, and 45 running feet of boat slip was built for another landing in southeast storms. About 80 running feet of plank walks were laid. Various repairs were made.

105. Black Marsh Channel, Lynn Harbor, Massachusetts.—The beacon was moved to a new site, on the westerly side of the channel, and the light was, on February 10, 1900, transferred to it. Various repairs were made.

106. Upper Turn Beacon, Lynn Harbor, Massachusetts.—A fixed white lantern light was established on April 16, 1900, on a new red pile dolphin at the upper turn in the channel.

108. Minots Ledge, Boston Bay, Massachusetts.—The light-keepers' dwellings were connected with the water supply of the town of Cohasset, 150 feet of sewer pipe was laid, a chimney repaired, and the road improved. By revocable license the town of Cohasset was permitted to occupy 85 square feet of the light-house land for a pump house. Various repairs were made.

The following recommendation, made in the Board's annual report, is renewed:

The keeper and one assistant, with their families, occupy an old dwelling, converted, about forty years ago, to that use from a barn. It is adapted to the use of but one family, and affords the two families neither the necessary room, privacy, nor conveniences. The double dwelling occupied by the two other assistants with their families is ill arranged. The main part for each family contains but two rooms below and a large, cold, and useless hall. It is necessary to do away with the hall and with the kitchen, which is under a shed roof, and to provide three comfortable rooms on each floor in the main part for each family. While the station is an important one, the dwellings are very inferior, and little has been expended upon them for many years. It is estimated that the rearrangement and renovation of the dwellings can be made for not exceeding $5,500, viz, $2,500 for the dwelling for the keeper and one assistant, $3,000 for the dwelling of the two assistants. The Board therefore recommends that $5,500 be appropriated therefor.

110–111. Boston, entrance to Boston Harbor, Massachusetts.—About 800 tons of riprap were provided, and 58 running feet of sea wall was built to protect the island and site of the double dwelling from the sea; a railway about 700 feet long was built from the wharf to the signal house, with car and engine; the old covered way was taken down; the brick chimney at the signal house was replaced by two steel stacks, and minor repairs were made to the tower. The fog-signal machinery was overhauled and repaired.

113. Narrows on the west end of the spit making out from Great Brewster Island, Boston Harbor, Massachusetts.—A water tank of about 600 gallons capacity was built and minor repairs were made to the dwelling. The fog-signal machinery was overhauled and repaired.

—. *State Ledge, Boston Harbor, Massachusetts.*—The following recommendation, which has been made in the last ten annual reports of the Board, is renewed:

The ship channel, from the Boston wharves to Nix Mate buoy, has no aids to navigation except buoys. Vessels find it very difficult in thick weather and at night to keep in the channel, and they are particularly perplexed to know just where to turn in the neighborhood of State Ledge and buoy No. 8, both in leaving and entering the harbor. Large excursion steamers, as well as steamers of the

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regular lines running out of Boston, frequently have to anchor in thick weather solely because they have no guide between Nix Mate buoy and the wharves. This greatly incommodes business men going and coming during the summer months when fogs are prevalent. The Board has recognized for a long time the necessity for a light and fog-signal at this point, but has postponed action while the improvements in the channel of the harbor in charge of the United States engineers were in progress. The Board is of opinion that the time has arrived when a light and fog-signal ought to be established near buoy No. 8, or at or near State Ledge. It is estimated that it will cost $42,000 to establish a light and fog-signal at this point.

It is recommended that an appropriation of this amount be made therefor.

117. Long Island Head, Boston Harbor, Massachusetts.—By the act approved on March 6, 1900, the sum of $4,500 was appropriated for removing the station to a new site where it will not be exposed to injury by firing of guns in the new seacoast battery. Plans are in progress for doing this work. Various repairs were made.

127. Duxbury Pier, off the end of the flats, Plymouth, Mass.—A cistern of 700 gallons was made in the concrete pier. Minor repairs were made.

128. Race Point, northwesterly point of Cape Cod, Massachusetts.—The fog-signal machinery was overhauled and put in order. Various repairs were made.

The following recommendation, made in the Board's last annual report, is renewed:

The assistants' dwelling has only one outer door, besides which the lower hall, stairs, and upper hall have to be used in common by both families. One family has only a kitchen on the lower floor and the other its kitchen and dining room, there being but three rooms on this floor. All other rooms used by both families are reached in common by one flight of stairs. The two families are deprived of privacy and are compelled to intermingle more or less, which causes dissatisfaction and discontent and is unfavorable to retaining assistants of the grade which the light and the first-class fog-signal at Race Point require. The keeper's dwelling has only two rooms on each floor, and he much needs and should have another room on each floor. It is estimated that the dwelling occupied by the two assistant keepers can be remodeled at a cost not exceeding $1,900, and that the keeper's dwelling can be remodeled at a cost not exceeding $900. The Board therefore recommends that an appropriation of $2,800 be made for remodeling the two dwellings as proposed.

129. Wood End, near the entrance to Provincetown Harbor, Massachusetts.—A revolving machine, for the optical apparatus, made in the light-house machine shop at Boston, was installed; about 150 running feet of plank walk was built, and repairs were made to the fuel house and the dwelling.

133. Sandy Neck, west side of entrance to Barnstable Harbor, Massachusetts.—The boathouse, wrecked by a storm, was rebuilt; 160 running feet of bulkhead was built to protect the site from the sea; new stairs and half deck of iron were put in the tower, and minor repairs were made to the roofs of the service rooms and the dwelling.

134. Cape Cod, on the highlands, seaward side of Cape Cod, Massachusetts.—A 4-horsepower oil engine with compressor was installed in place of an old caloric engine, completing the installation of the fog-signal apparatus in duplicate; a brick oil house was built, a brick floor was laid in the engine house, and a concrete floor in the covered way. By the act approved June 6, 1900, $15,000 was appropriated for changing the characteristic of the light from a fixed to a flashing light.

144. Monomoy Point, on Monomoy Beach, Cape Cod, Massachu-

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setts.—The interior of the lower story of the dwelling was entirely renewed and rearranged. Various repairs were made.

151. Gay Head, Marthas Vineyard, Massachusetts.—Three flights of new iron stairs were placed in the tower, the stairway was enlarged through the three cast-iron decks, and a new down spout provided. The revolving clocks for the lenses were put in order.

152. Brant Point, west side of entrance to Nantucket Harbor, Massachusetts.—A fixed red lens-lantern light was installed at the extremity of the point, 600 feet from the fourth-order light.

157. Bishop and Clerks, Nantucket Sound, Massachusetts.—The striking machine for the fog-bell was rebuilt. Various repairs were made.

163. Edgartown, north side of the inner harbor of Edgartown, Mass.—The dwelling standing on a pier of dry stone masonry, was provided with a new lower floor containing an intermediate layer of mortar, and 900 running feet of pipe was laid to the well. Minor repairs were made.

166. Nobska Point, entrance to Woods Hole Harbor, Massachusetts.—A new house was built for the striking machine for the fog-bell and the machinery overhauled and put in order; the bell tower was strengthened, the site was protected from the sea by a stone apron; about 25 running feet of bridge was built, and the fuel house and barn were rebuilt.

175. Palmer Island, west side of entrance to New Bedford Inner Harbor, Massachusetts.—A fog-bell struck by machinery was established on May 31, 1900, in a new pyramidal wooden tower. New stairs and half deck of wood were built in the light tower.

178. Bird Island, east side of entrance to Sippican Harbor, Massachusetts.—The boat-house was enlarged and rebuilt, and 286 running feet of close board fence was built. Various repairs were made.

REPAIRS.

Repairs more or less extensive were made at the following named stations:

81. Salisbury Beach, Mass.
83. Newburyport Harbor, Mass.
88. Annisquam Harbor, Mass.
94. Tenpound Island, Mass.
95. Baker Island, Mass.
98. Fort Pickering, Mass.
99. Derby Wharf, Mass.
100. Marblehead, Mass.
102. White Rocks, Mass.
103. Black Rocks, Mass.
104. Sandy Point, Mass.
118. Spectacle Island, Mass.
124. Scituate Breakwater, Mass.
130. Long Point, Mass.
135, 136, 137. Nauset Beach, Mass.
138, 139. Chatham, Mass.
148. Nantucket (Great Point), Mass.
149. Sankaty Head, Mass.
155. Stage Harbor, Mass.
162. Cape Poge, Mass.
163. Edgartown, Mass.
164. East Chop, Mass.
165. West Chop, Mass.
169. Tarpaulin Cove, Mass.
172. Cuttyhunk, Mass.
173. Dumpling Rock, Mass.
174. Butler Flats, Mass.
177. Ned Point, Mass.
179. Wings Neck, Mass.

LIGHT-VESSELS.

107. Boston light-vessel, No. 54, Boston Bay, entrance to Boston Harbor, Massachusetts.—This vessel was built of steel in 1892, is of 310 tons gross burden, has a steam fog-signal, and is moved by her own propeller. At the time this light-vessel was established, the draft

of steamships bound in and out of the port of Boston did not exceed 26 feet, and they could lay a true east course from the Black Buoy off Point Allerton, without danger of striking bowlders that have been discovered outside that point. But since that time the draft of steamships has been greatly increased until now vessels drawing 32 feet pass in and out of the harbor. Upon representation of these facts, emphasized by the striking on rocky bottom off Point Allerton of the Cunard steamer *Ultonia* in October, 1899, the location of this light-vessel was changed, and on January 9, 1900, she was moored about 1 mile north of her original position, and 6 miles E. ½ S. from Boston Light-House. Her new station enables vessels to take the deep-water channel to the northward of Thieves Ledge, the course from the channel midway between Point Allerton and Boston Light-House carrying a depth of water at low tide of not less than 8 fathoms. She received a new main boom, new worm for windlass and new bell. She was also furnished with rope, galleyware, engineer supplies, lantern glass, mattress covers, life preservers, iron piping, etc., and her medicine chest was replenished.

140. Pollock Rip Shoals light-vessel, No. 73, Massachusetts.—An appropriation of $80,000 was made by the act approved on March 3, 1899, for the establishment of a light-house or light-vessel to mark this shoal. As a suitable light-house could not be built for the sum named, a contract was made and approved on December 29, 1899, for the building of this light-vessel, which is to be finished in ten months, and the work is now well in hand. By the act approved on June 6, 1900, an appropriation of $5,000 was made for an automatic towing machine which is to be used on the light-vessel as automatic riding bitts to relieve the tremendous strain upon her moorings. The proper measures are being taken to have this machine placed in the light-vessel.

143. Pollock Rip light-vessel, No. 47, off Chatham, Cape Cod, Massachusetts.—This composite vessel of about 296 tons gross burden was built, with a steam fog-signal, in 1891. After being hauled out and repaired in the latter part of June, 1899, she was towed from New Bedford, and on July 15, 1899, was replaced on her station. On November 23, 1899, by fouling her chain, she was dragged slightly from her station, but was replaced the following day. On December 5, 1899, she was run into by the steamer *Lampasas*, being struck a glancing blow on the port bow, putting out all her lights, breaking the chimneys, knocking down men who were on deck, and splitting her false stem. On February 4, 1900, she was struck a glancing blow by the barge *Woodbury*, in tow, when but little damage was sustained. On May 15, 1900, a tow of three barges, belonging to the Consolidated Coal Company of Baltimore, collided with this light-vessel, carrying away both catheads, portions of the head rail, the upper bulwarks around starboard bow were badly strained from the stem to the fore rigging, her boat davits were damaged, the after oak fender was broken off, and the side of the ship was badly scraped. On June 12, 1900, the vessel was brought into New Bedford for repairs to her stem, etc., caused by collision of steamer *Lampasas* on December 5, 1899, and the damage of May 15, caused by the collision of the barge of the Consolidated Coal Company of Baltimore. Repairs were made to her windlass and boiler. She will be ready to return to her station in about a month. Repairs caused by collisions will be paid for by the

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owners of the colliding vessels. She was supplied during the year with an awning, bedding, galleyware, rope, canvas, iron piping, lantern glass, engineer supplies, etc., and her medicine chest was replenished.

145. Shovelful Shoal light-vessel, No. 3, off Monomoy Point, Cape Cod, Massachusetts.—This wooden vessel of about 140 tons gross burden, was built in 1853, and has a bell for a fog-signal. After extensive repairs, completed in June, 1899, this vessel was on July 8, 1899, towed from New Bedford and replaced on her station. On the morning of March 22, 1900, the schooner *Nettie Champion*, of Somers Point, N. J., came into collision with her, breaking boat carriers, cranes, and two planks of the boat. The damage was repaired and paid for by the schooner. The light-vessel was supplied with a grindstone, stovepipe, bedding, and canvas. In July, 1899, a new foresail mast was put in.

146. Handkerchief light-vessel, No. 4, Nantucket Sound, Massachusetts.—This wooden vessel of about 104 tons gross burden was built in 1855, and has a bell for a fog-signal. On August 21, 1899, she was towed to New Bedford for repairs. When she was hauled out her copper was patched, her stem was repaired with sheet lead, seams caulked, old rigging taken off and replaced by new wire rigging, new hawse pipe put in, new day marks supplied, lantern winch overhauled, new chain furnished, iron boat davits refitted, two new oil rooms built, boat cradles fitted, new tiller furnished, and four berths built forward of the old ones. She resumed her station November 3, 1899. She was supplied with blocks, new galley stove, dory, canvas, water breakers, hose, etc., and her medicine chest was replenished.

147. Great Round Shoal light-vessel, No. 42, off Nantucket, Mass.—This wooden vessel of about 410 tons gross burden, with a compressed air fog-signal, was built in 1877. On June 15, 1900, by the explosion of the lamp used for heating the vaporizer of her fog-signal engine, the woodwork in the engine room was set on fire, but it was extinguished before any serious injury was done. She was supplied with stovepipe, engineer supplies, iron pipe, heater, pump valves, lumber, yellow metal, flanges for engine and the like. Brakes to the windlass were repaired.

150. Nantucket Shoals light-vessel, No. 66, about 41 miles to the southward and eastward of Nantucket, Mass.—This composite vessel was built in 1895–96. She is a screw steamer, of 385 tons gross burden, and has a steam fog-signal and electric-lens lanterns at her fore and main mastheads. On September 27, 1899, this vessel, being relieved by relief light-vessel No. 58, came from her station, under her own steam, to New Bedford to take in coal and rations. On October 8, 1899, she resumed her station. While in New Bedford repairs were made to her boiler tubes and the like. On January 2, 1900, at 3.30 p. m., she parted her moorings during a very heavy northwest gale and arrived at New Bedford under her own steam on January 4, having lost her mushroom anchor and 150 fathoms of chain. On January 6 she was replaced on her station with the assistance of the tender *Azalea*. She was supplied during the year with engineer stores, a set of grate bars, hose, chronometer, inspirator, galleyware, zinc for boiler, blocks, electric lamps, masthead lamps, locks, ladder, and the like. Her compasses were adjusted in October, 1899.

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160. Cross Rip light-vessel, No. 5, Nantucket Sound, Massachusetts.—This wooden vessel, of about 171 tons gross burden, new measurement, was built in 1864, and has a bell for a fog-signal. On February 22, 1900, the tug *Underwriter*, of the Boston Tow Boat Company, with a tow of barges, collided with this vessel, splitting her stem and breaking the top rail on the port side. The damage was repaired on the station, and it was paid for by the Tow Boat Company. She was supplied with lumber, paints, and the like.

161. Succonnesset Shoal light-vessel, No. 6, Nantucket Sound, Massachusetts.—The date when this wooden vessel was built is unknown, but she was thoroughly repaired in 1880. She is of about 140 tons gross burden, and has a bell for a fog-signal. On June 5, 1900, she was brought into New Bedford for repairs, when she was hauled out on the ways and some 35 sheets of yellow metal put on where the old sheathing had been worn by ice. Repairs were made to her boat, starboard bitt, windlass, topgallant forecastle, steering gear, spar deck, and waterways; two side ports were leaded, the deck iron for galley stovepipe and lantern-house gear were furnished, and her decks were calked. She will resume her station early in July, 1900. She was supplied with hose, stove linings, new deck pump, complete with suction hose, foresail and forestaysail, mattresses, pillows, life-preservers, and her medicine chest was replenished.

170. Vineyard Sound light-vessel, No. 41, western entrance to Vineyard Sound, Massachusetts.—This wooden vessel is of about 387 tons gross burden, and was built in 1876. She has a steam fog-signal. On July 16, 1899, she was brought to New Bedford for repairs. She received a new sail mast, a hard pine support was put under her port boiler, new ash pans and steel fronts were fitted to both boilers, the whistle engine was overhauled and repaired, a new valve for the fog-signal whistle was supplied, a new sheet-iron ring was fitted to the umbrella of the smokestack, the forecastle deck was raised and steel stanchions were put in, the doors of the engine room were refitted and hoods were put on top, the fender for the anchor on the starboard side was repaired, the lantern-house doors were repaired, new lantern-hoisting winches were supplied, and the vessel was hauled out on the ways and copper-patched. She resumed her station on August 19, 1899. During the night of December 13, 1899, the head of her foremast came down, landing on the forward davit of the liberty boat, carrying it away, splitting the boat bearer, and damaging the boat somewhat. On December 16 she was brought to New Bedford when a new mast and an iron crutch to the main boom were supplied, braces for the cranes of the liberty boat were repaired, the boat davits were refitted, the boat was repaired, and the day mark was straightened and repaired. The vessel was returned to her station on January 13, 1900. She was supplied with blocks, furniture, tableware, galley ware, lantern glass, lumber, iron pipe, engineer supplies, and the like. The binnacle was refitted and medicine chest replenished. The distiller was overhauled and put in working order.

171. Hen and Chickens light-vessel, No. 2, entrance to Buzzards Bay, Massachusetts.—This wooden vessel was built in 1849. She is of about 210 tons gross burden, new measurement, and has a bell for a fog-signal. On July 11, 1899, she was brought into New Bedford for repairs, when she was hauled out on the ways, her bottom was cleaned and copper-patched, the old foremast was taken out and a

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new one supplied, deck calked, windlass overhauled, and new ports furnished. Locks, catches, and hinges on houses were renewed, the small boat was repaired, the davits rigged to swing in the liberty boat, a forestaysail was furnished, and the rigging was overhauled. She resumed her station on August 21, 1899. She was supplied with blankets, bedding, tableware, stovepipe, ship's lamp, and megaphone.

Relief light-vessel No. 9.—This wooden vessel was built in 1857. She is of about 186 tons gross burden, new measurement, and has a bell for a fog-signal. On July 7, 1899, while on Shovelful Shoal station she was run into by a schooner, carrying away her bowsprit and the false piece on the stem, from the water line for about 5 feet upward. The damage was repaired and was paid by the owners of the schooner. Shovelful Shoal light-vessel No. 3 was returned to her station the next day, and this light-vessel was withdrawn. On July 11 she was put on Hen and Chickens station, remaining until August 21, when she was withdrawn and towed to Handkerchief station, relieving that light-vessel on the same date, and remaining there until November 3, 1899, when she was withdrawn and taken to Woods Hole, where she remained until June 5, when she was placed on Succonnesset Shoal station, remaining as the relief of light-vessel No. 6, which was undergoing repairs. She was supplied with stovepipe and galley ware. Slight calking to her deck was done.

Relief light-vessel No. 58.—This iron vessel was built in 1894. She is of about 449 tons gross burden, and has a steam fog-signal and a propeller. On July 15, 1899, Pollock Rip light-vessel No. 47 was returned to her station and light-vessel No. 58 was withdrawn, and on the next day was placed on Vineyard Sound station, where she remained until August 19, when she was relieved and steamed to New Bedford. On September 25 she steamed from New Bedford to Nantucket Shoals station, relieving light-vessel No. 66, when the latter came into port to receive a supply of coal and rations. On October 8, 1899, light-vessel No. 66 resumed her station, and light-vessel No. 58 came back to New Bedford. On October 30 she again steamed to Nantucket Shoals station, taking out supplies and that portion of the crew which had been absent on liberty. On December 3 she again took out coal and the liberty crew to the Nantucket Shoals light-vessel, and after a stormy passage and much difficulty in getting coal on board light-vessel No 66, she returned to port on December 8. On December 16 she was placed on Vineyard Sound station, where she remained, while repairs were made to light-vessel No. 41, until January 13, 1900, when she returned to New Bedford. On June 12 she was placed on Pollock Rip light-vessel No. 47 station, where she now is. Early in September, 1899, she was hauled out on the ways, when her bottom was cleaned and painted, and her fog-signal machinery was overhauled. In November repairs were made to the eccentric rods of her engine. In April, 1900, slight repairs were made to her windlass and davits, and a new ash chute made. During the year her deck was calked slightly, her boat repaired, her transom cushions were made over, an iron worm for the windlass was supplied, new tubes were put in the evaporator, and the medicine chest was replenished. She was supplied with packing, megaphone, tools, yellow metal, galley ware, bed-springs, iron pipe, lumber, engineer supplies, and wire rope, springs for riding stopper and tube rods.

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DAY OR UNLIGHTED BEACONS.

These are now, with a few exceptions, in good order, and most of them have been painted this season by the crews of the tenders. No additional beacons have been established during the year, but several have been repaired.

Point Allerton Beacon, entrance to Boston Harbor, Massachusetts.—Some 500 tons of riprap stones were placed around the beacon to protect it from the sea.

Pig Rocks Beacon, approach to Weymouth River, Massachusetts.—Some 100 tons of riprap stones were placed around the beacon to protect it from the sea.

Sunken Ledge Beacon, southwest extremity of Nantasket Roads, Massachusetts.—A stone which had been displaced from the beacon was replaced, and 100 tons riprap stones were placed around it for protection.

Barekneed Rocks, off Nonquitt, Massachusetts.—An iron spindle surmounted by a cask was erected.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

90–91. Cape Ann, Massachusetts.—This 10-inch steam whistle was in operation about 617 hours and consumed some 38 tons of coal.

92. Eastern Point, Massachusetts.—This 4,000 pound fog-bell was in operation about 474 hours, and consumed some 468 gallons of mineral oil.

107. Boston light-vessel, No. 54, Massachusetts.—This 12-inch steam-chime whistle was in operation about 596 hours, and consumed some 126 tons of coal. In addition, 13 tons were used for heating ship, etc., making a total of 139 tons consumed.

110. Boston, Massachusetts.—This first-class siren was in operation some 652 hours, and consumed about 31 tons of coal.

128. Race Point, Massachusetts.—This 12-inch steam whistle was in operation some 694 hours, and consumed about 30 tons of coal.

134. Cape Cod, Massachusetts.—This first-class Daboll trumpet was in operation some 838 hours, and consumed about 419 gallons of mineral oil.

143. Pollock Rip light-vessel, No. 47, Massachusetts.—This 12-inch steam-chime whistle was in operation some 892 hours, and consumed about 102 tons of coal. In addition, 8 tons were used for heating ship, etc., making a total of 110 tons consumed.

147. Great Round Shoal light-vessel, No. 42, Massachusetts.—This 10-inch whistle, operated by compressed air, was in operation some 1,073 hours, and consumed about 4,830 gallons of mineral oil in engine.

150. Nantucket Shoals light-vessel No. 66, Massachusetts.—This 12-inch steam whistle was in operation some 951 hours, and consumed about 153 tons of coal. In addition, 293 tons were used for electric lighting and heating the ship, making a total of 446 tons consumed.

165. West Chop light-station, Massachusetts.—This 10-inch steam whistle was in operation some 669 hours, and consumed about 47 tons of coal.

170. Vineyard Sound light-vessel No. 41, Massachusetts.—This 12-inch steam whistle was in operation some 852 hours, and consumed

about 81 tons of coal. In addition, 17 tons were used for heating ship, etc., making a total of 98 tons consumed.

173. Dumpling Rock, Massachusetts.—This Daboll trumpet was in operation some 707 hours, and consumed about 1,099 gallons of mineral oil.

—. *Relief light-vessel No. 58, Massachusetts.*—This 12-inch steam whistle was in operation some 264 hours, and consumed about 61 tons of coal. In addition, 15 tons were used for heating ship, etc., making a total of 76 tons consumed.

BUOYAGE.

On August 2, the State Ledge electric fog-bell buoy, Boston Harbor, was temporarily removed, on account of dredging operations. On August 11, a second-class red and black horizontally striped can buoy was placed in Boston Harbor, off Point Allerton, to mark shoal water not shown on the chart, in the neighborhood of which the steamship *Ultonia*, on August 5, 1899, struck an obstruction. This buoy was removed March 29, 1900. In September four can buoys were placed off Cape Ann to mark the speed course of the battle ship *Kearsarge*, and were on September 28, 1899, taken up, after the trial. A black spar buoy, marked "wreck" in white letters, was placed on the westerly side of the main ship channel, Boston Harbor, near Gallups Island, to mark the wreck of a sunken mud scow. This buoy was discontinued October 12, 1899, the scow having been removed. On October 23, 1899, a gas buoy was established to mark the wreck of the schooner *Two-Forty*, sunk in the main ship channel, near Castle Island, Boston Harbor. On October 25, 1899, the buoy placed to mark the wreck of the *Two-Forty* was taken up, the wreck having been removed.

On November 1, 1899, Normans Woe bell buoy, Gloucester Harbor, reported capsized, was replaced by a fresh buoy. On November 6, 1899, Stone Horse Shoal north-end buoy, Nantucket Sound, was replaced, it having been dragged by a tow. On November 16, 1899, the northwest end of the Lower Middle iron spar buoy was temporarily removed, on account of dredging operations in the main ship channel, Boston Harbor, and was replaced December 30, 1899. On November 20, 1899, four first-class can buoys were placed to mark the speed course of the battle ship *Kentucky*, off Cape Ann, and were removed December 13, 1899, upon completion of the trial. On November 27, 1899, work was commenced laying cable for replacing the State Ledge electric fog-bell buoy, Boston Harbor. This buoy was temporarily removed August 2, 1899, on account of dredging operations. After much time and money had been expended in laying this cable it was found faulty, and was condemned by electrical experts. On April 1, 1900, this buoy was discontinued, and was reestablished on the same date, with a new cable, on the opposite side of the channel, and designated as Castle Rocks electric fog-bell buoy. On December 15, 1899, Pollock Rip Shoal buoy No. 4 was dragged from its position by a tow, and on December 20, 1899, was replaced. On December 25, 1899, this buoy was again carried several miles from its position by a tow, and on December 27, 1899, was replaced. On December 21, 1899, Seventy-Four Bar buoy, going up the main ship channel, Boston Harbor, was changed to a new position about 100

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yards NW. by W. from the old station. On January 5, 1900, a gas buoy was placed to mark the wreck of the United States tug *Resolute*, sunk in the main ship channel, Boston Harbor, near Castle Island. This buoy was discontinued on January 9, 1900, the tug having been raised and removed. On January 8, 1900, the bell buoy on the broken part of Pollock Rip, north part, was dragged from its station and damaged, but was recovered, and a new buoy was placed on the station.

On January 9, 1900, a second-class whistling buoy, painted black and marked "Thieves Ledge" in white letters, was established north of Thieves Ledge, in 42 feet of water, to mark that ledge at the entrance to Boston Harbor. On January 28, 1900, a gas buoy, showing a flashing light, was placed 100 feet south of the wreck of the steamer *Ardandhu*, sunk near Robinsons Hole, Vineyard Sound, Massachusetts. On February 19, 1900, the bell buoy on the broken part of Pollock Rip, north part, was fouled by a passing tug and dragged from its position. It was replaced on the same date. On February 15, 1900, the tender *Azalea* put down a new buoy to take the place of Nantucket Shoals light-vessel station buoy, which, on January 21, 1900, had been carried away. On March 2, 1900, Wreck Rock spar buoy, in President Roads, was reported missing, and was replaced by another buoy. On March 2, 1900, Nash Rock spar buoy, Boston Harbor, was reported missing and replaced by a new buoy. On March 8, 1900, Sow and Pigs nun buoy disappeared from its station and was replaced by a new buoy. On March 9, 1900, the bell buoy on the broken part of Pollock Rip, north part, disappeared from its station and was replaced by a new buoy. On March 20, 1900, Normans Woe bell buoy was sunk. The location was dragged, but the buoy was not recovered. A new buoy was put in its place. On March 22, 1900, the end of the breakwater gas buoy, Gloucester Harbor, was damaged by a collision and replaced by a fresh buoy. On April 3, 1900, a gas buoy, showing a flashing light, was established in 57 feet of water to mark wreck of the schooner *Abraham Richardson*, sunk in Nantucket Sound, off East Chop. This buoy was discontinued on April 13, the wreck being no longer a menace to navigation. On April 4, 1900, Seventy-Four Bar buoy, Boston Harbor, dragged from its position and was replaced by the tender next day. On April 6, 1900, Lumber Rock buoy, Westport Harbor, was reported missing from its station. A new buoy was set on April 11, 1900. On April 7, 1900, the whistling buoy off Gurnet Point was reported missing from its station. It was recovered, and on April 8 was replaced by the tender. On April 16, 1900, Pollock Rip Slue North Entrance buoy No. 2A, red, first-class nun, was established in 26 feet of water on the westerly side of the northerly entrance to the Slue and off the northeastern end of Bearses Shoal. On April 16, 1900, Pollock Rip Slue gas buoy was moved to the southward and eastward of its old position and reestablished in about 29 feet of water. On April 16, 1900, Pollock Rip buoy No. 2, red, nun, was moved to the southward and eastward of its old position and was reestablished in about 32 feet of water. On April 16, 1900, Pollock Rip Shoal buoy No. 4, red, nun, was moved from its old position and reestablished in about 32 feet of water. On April 19, 1900, Middle Ledge, east end, spar buoy was dragged from its position and was replaced on the next day. On April 30, 1900, a red and black horizontally striped spar buoy, placed

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in April, 1899, to mark the wreck of a schooner in Weymouth Fore River, near Quincy Point, was removed, the wreck having disappeared. Also, on the same date, a spar buoy marking the wreck of a schooner in Lynn Harbor was removed, the wreck having disappeared. This latter buoy had been in place for several years. On May 24, 1900, there was established a red spar buoy, No. 2, at the entrance to the dredged channel to L street drawbridge, South Boston. On June 9, 1900, an iron spar buoy, painted white, was established temporarily about 6 miles off Halfway Rock, Boston Bay. On June 10, 1900, the bell buoy on the broken part of Pollock Rip, north part, was run into and the cage and bell were carried away. It was replaced by a new buoy. On June 25, 1900, Pollock Rip Shoal buoy No. 4 was dragged from its position to a point off Chatham, where it was recovered by the tender *Azalea*, and it was replaced on its station the next day. On June 28, 1900, a spar buoy, red, No. 10, and designated Channel Rocks buoy, was established in Essex River, Massachusetts, to mark the extremity of a triangular patch of rocks on the western side of the channel.

DEPOTS.

Lovells Island, Boston Harbor, Massachusetts.—A new brick oil house was built; the west side of the coal shed was shingled and the sills and the floor partly renewed; about 2,400 square feet of platform adjoining the wharf was renewed; about 130 running feet of plank walk was built and 1,000 square feet of plank was laid in the wharf.

Woods Hole, Woods Hole, Massachusetts.—The keeper's dwelling was connected with the Falmouth water system. The coal run, coal and storehouse roofs, walks and steps to the dwelling were repaired and a new boom was supplied for the stone derrick.

Castle Island buoy depot.—Extended repairs and improvements are required at the Lovells Island buoy depot, and it is estimated that it would cost $11,500 to put it in good condition, but this site must now be abandoned, it being required by the War Department. Castle Island, also the property of the United States, is only 2 miles from Boston. It contains Fort Independence, but no modern defenses, while Lovells Island is 6 miles from the city and is to have modern defenses. It is understood that the use of all of Castle Island exterior to the fort is abandoned during the pleasure of the United States to the city for a park, made accessible by a bridge. The area of 1½ acres between the sea wall and the front of the fort that faces the wharf is only a small part of the island and could be easily isolated by building 150 feet of fence from the salients of the fort to the sea wall. It slopes gently from the fort to the wall and would make a good depot—far better than that at Lovells Island—and better than it is possible to obtain anywhere else in Boston Harbor or its vicinity. By enlarging the present wharf a well-sheltered berth could be formed where two tenders could lie at all times, saving wharfage at Boston, which is becoming more and more costly and difficult to obtain. The depot and tender would be in close communication with the inspector's office by telephone and electric car, and the labor of the crews of the tenders could be utilized to the utmost at the depot and much of their time saved which is now lost. The utimate cost of establishing a depot at Castle Island for wharf, storehouse, coal shed, keeper's dwell-

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ing, railway with car, derrick, and skids is estimated at $25,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

Machine shop, Boston, Mass.—Repairs to the illuminating apparatus, the fog-signal apparatus, and to the iron work for structures in the First and Second districts were in progress in the shop throughout the year, including the improvement of the fog-signal plant, the installation of improved machinery for fog-signals by compressed air, and the rebuilding of revolving clocks for the optical apparatus, and of striking machines for fog bells, besides miscellaneous minor repairs.

TENDERS.

Mayflower.—This steel screw steamer, of about 572 tons gross burden, built in 1897, has been in constant service, except during 37 days, when she was laid up for repairs. She has changed or replaced 270 buoys, painted 120 buoys, painted 12 beacons, marked 4 wrecks, delivered to light-vessels and stations 336 tons of coal and 23 cords of wood, besides delivering 116 loads of rations and supplies. She was employed 30 days at buoy depot. She steamed 8,480 miles and consumed 1,363 tons of coal. On April 28, 1900, she went into dry dock and her bottom was scraped and painted. From May 1 to 9, 1900, she was at wharf undergoing general overhauling of her steering gear and bell wires. She then went to East Boston and was laid up until June 5, 1900, for repairs to boilers, starboard combustion chamber, and crank shaft. The fire-room plates were straightened, the piping of the water column was changed, and the sheathing in main deck was calked. She was supplied with engineer stores, lathe, blocks, galley ware, valve springs, sash balances for windows, canvas, glassware, paints, and manila rope, and the cushions of the boat, table linen, and mattress covers were renewed, and in September, 1899, her compasses were adjusted.

Azalea.—This steel screw steamer was built in 1891 and is of about 423 tons gross burden. She has been in constant service, except for 76 days, when under repairs. She changed or replaced 138 buoys, painted 259 buoys, painted 3 beacons, marked 2 wrecks, delivered to light-vessels and stations 431 tons of coal, besides delivering 145 loads of rations and supplies. She was employed 61 days at the buoy depot, steamed 10,764 miles, and consumed 984 tons of coal. On July 13, 1899, she was hauled out on the ways, her bottom was scraped and painted, repairs were made to her boilers, and the ironwork of the gangway was repaired. On September 23, 1899, she proceeded to New York for duty in connection with laying of buoys for naval fleet. On the night of October 2, 1899, when returning to New Bedford upon completion of this duty, she was run into off Cornfield Point light-vessel by the schooner *Wm. H. Davenport.* The stem of the *Azalea*, above the water line and 3 feet below the top rail, was broken and bent direct to starboard and aft for about 4 feet, the side bow plates being bent at right angles and back to the collision bulkhead. The hawse pipes were driven inboard about 15 inches. The vessel developed no leak and proceeded to New Bedford. On October 11, 1899, she came to Boston and was docked for the purpose of determining extent of injury. Repairs were made at a cost of $4,261 for damage caused by the collision. At this time a new derrick mast was supplied, and the main boiler was repaired by renewing 78 socket

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bolts and soft patching bottom of back connection, the thrust bearing of engine was refastened, fire-room floor was furnished with new angle-iron supports and plates, and new anchor davits were supplied. The work being completed, she left Boston for New Bedford, November 28, 1899. On April 23, 1900, she was hauled out on the marine railway, when her bottom was scraped and painted. She was supplied with a new propeller, and the vessel's deck was calked. She was supplied with a marine glass, paints, manila rope, and table linen; her mattresses were made over, and she received engineer supplies, galley ware, grate bars, blocks, rubber hose, and the like.

Verbena.—This wooden side-wheel steamer was built in 1870 and is of about 294 tons gross burden. She was constantly employed, except during 122 days, when under repair. She changed or replaced 224 buoys, painted 58 buoys and 11 beacons. She delivered to light-vessels and stations 357 tons of coal, besides delivering 112 loads of rations and supplies. She was employed 10 days at the buoy depot. She steamed 5,833 miles and consumed 726 tons of coal. On January 2, 1900, she was laid up to install a surface condenser, circulating pump, and filter box, and repairs were made to her boiler and furnaces, consisting of new legs, side and crown sheets, new stay bolts throughout the furnaces, hard patches on the saddle sheets and in the back connections. The butt straps on the front of the boiler were renewed and extended on the ends and made to cover worn places on the front furnace heads. New ash-pan linings were furnished and fitted, 5 new boiler tubes were put in, and minor repairs made where necessary. The hoisting engine was also repaired and the bottom part of the engine fitted with a patch of cast iron. On April 26, 1900, she resumed duty. On June 9, 1900, she steamed from Boston to the southern part of the district. She was supplied with blocks, paints, manila rope, compasses, galley ware, steam trap, vise, iron piping, bilge injector, brass pipe, zinc for boilers, engineer supplies, and in September, 1899, her compasses were adjusted.

Myrtle.—This wooden screw steamer was built in 1872 and is of about 348 tons gross burden. She was laid up for repairs from December 21, 1899, to March 31, 1900, inclusive. Her house was about three-quarters rebuilt and strengthened by 4 strong bulkheads; her boiler was retubed and its shell repaired; her machinery was thoroughly overhauled and a new throttle valve made; her copper and holding-down bolts were examined and put in order; minor repairs were made to her forecastle, cabin, saloon, chart house, galley, and cold-storage room. Her searchlight was repaired and a storage battery provided. Although 28 years old she is in thoroughly sound and seaworthy condition. She was very actively employed during the year in the transport of material to stations for repairs. She steamed 11,700 miles and consumed 650 gross tons of coal.

THIRD DISTRICT.

This district extends from Elisha Ledge, off Warren Point, Rhode Island, to a point on the coast of New Jersey opposite Shrewsbury Rocks, and includes the ledge and the rocks. It embraces all aids to navigation on the coasts of Rhode Island, Connecticut, and New York, and of New Jersey northward of the point opposite Shrewsbury Rocks, and on all tidal waters tributary to the sea or Long Island Sound between the limits named, together with the aids on Whitehall Narrows and on the United States waters of Lakes Champlain and Memphremagog.

It now includes the light-house service of Porto Rico, and the adjacent islands, and the waters of the islands lying east of the seventy-fourth meridian of longitude west of Greenwich, of which, by direction of the Treasury Department, the Light-House Board assumed charge on May 1, 1900.

Inspector.—Capt. Edwin M. Shepard, United States Navy.

Engineer.—Lieut. Col. David Porter Heap, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 97 post lights	269
Light-houses in Porto Rico	15
Light-vessels in position	8
Light-vessels for relief	4
Day or unlighted beacons	47
Fog signals operated by caloric or oil engines	27
Fog-signals operated by clockwork	61
Electric-lighted buoys	11
Gas-lighted buoys	12
Whistling buoys in position	5
Bell buoys in position	28
Other buoys in position	570
Steamer *Armeria*, used for supplying the light-stations of the Atlantic and Gulf coasts	1
Steamers *John Rodgers* and *Cactus*, buoy tenders, and for supply and inspection of light-stations	2
Steamer *Gardenia*, buoy tender and for freight	1
Steamers *Mistletoe* and *Iris*, used for works of construction and repair of light-stations, fog-signals, and day beacons	2
Steam launch *Nettle*, for works of construction and repair on Lake Champlain	1
Steam launch *Daisy*	1

LIGHT-STATIONS.

182. Beavertail, Rhode Island.—The fog-signal was altered, without change of characteristic, from a 10-inch steam whistle in duplicate to a second-class automatic siren in duplicate, consisting of two 13-horse-power oil engines, two air tanks, two automatic sirens, and an automatic signal. Complaint was made that the sound of the new signal was not sufficiently loud. To remedy this, larger trumpets were recently furnished and a deflector was built on the roof of the fog-signal house to deflect the sound of the trumpets to the seaward. The color of the

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upper half of the tower was changed from gray to white. Various repairs were made.

188. Gull Rocks, Rhode Island.—The power of these lights was increased by substituting lens lanterns for the former post lanterns. The color of the easterly light was changed from red to white and the color of the westerly light from white to red.

191. Hog Island Shoal, Rhode Island.—Bids were asked for the metal work and erection of the structures here, combined in one contract.

195. Borden Flats, Massachusetts.—Improved fifth-order lamps were furnished and fitted. The color of the light was changed from red to white.

197. Dutch Island, Rhode Island.—Three stone boundary posts were placed to mark the limits of the reservation. The fog-signal was repaired and new parts were fitted. Various repairs were made.

198. Plum Beach, Rhode Island.—A temporary lens apparatus was installed.

The following recommendation made in the Board's last annual report is renewed:

It is estimated that a fog-signal could be established at a cost of $1,343, and it is recommended that an appropriation of this amount be made therefor.

200. Conanicut Island, Rhode Island.—A blower siren was established, consisting of a 2½-horsepower oil-burning engine, with blower siren and trumpet to sound a continuous blast during thick or foggy weather. A water tank of 833 gallons capacity was provided.

202. Warwick, R. I.—A blower siren signal was established, consisting of a 2½-horsepower oil engine, a blower siren, trumpet, etc., to sound a continuous blast during thick or foggy weather. Various repairs were made.

205. Bullock Point, Rhode Island.—An oil house was built. Riprap stone was removed from boat landing.

206. Sabine Point, Rhode Island.—A fog-bell signal was established, consisting of a 10,000-blow striking machine, with a 160-pound bell arranged to strike a single blow every 9 seconds. The color of the lens light was changed from white to red. An oil house was built. Minor repairs were made.

207. Pomham Rocks, Rhode Island.—The landing pier was raised, enlarged, and repaired. A fog-signal house, with a cistern of 1,250 gallons capacity, was built. A blower siren signal was established, consisting of a 2½-horsepower oil engine, with blower siren and trumpet arranged to sound a continuous blast.

208. Fuller Rock, Rhode Island.—The color of the lens light was changed from red to white.

209. Sassafras Point, Rhode Island.—The color of the lens light was changed from red to white.

218. Montauk Point, New York.—A deflector was built to deflect the sound of the fog-signal to the eastward, to provide against a lack of sound in that direction. Various repairs were made.

223. North Dumpling, New York.—The old fog-bell machine was replaced by a new one. Various repairs were made.

224. New London Harbor, Connecticut.—An addition was built to the keeper's dwelling to provide quarters for the assistant keeper. The old fog-signal house was converted into an oil storehouse. Various repairs were made.

Third District.

—. *Black Ledge, New London Harbor, Long Island Sound, Connecticut.*—The following recommendation was made in eight recent annual reports of the Board:

The necessity for establishing a light and an efficient fog-signal in such a position as to enable vessels to enter and leave the harbor of New London, Conn., has become evident, and especially so for the aid of those approaching from seaward.

The numerous outlying shoals and ledges surrounding the entrance to this harbor make the approach to it dangerous in thick weather. The location of the present New London light and fog-signal station is so far inside the obstructions as to be partially ineffective as an aid for the purpose of safe navigation of this entrance. The commerce of the port of New London has so increased since the erection of the present light as to change the conditions materially. In view of these facts and the further fact that a naval station is in operation on the Thames River, which empties into New London Harbor, it is suggested that a light and fog-signal station be established on the southwest ledge on the eastern side of the entrance to New London Harbor. Estimate is made that it can be done for $45,000. It is therefore recommended that an appropriation of that amount be made therefor.

The Board now estimates that as prices are at the present time $60,000 will be required for this work, and recommendation is therefore made that an appropriation of that amount be made therefor.

244. Race Rock, New York.—A new siren and trumpet were fitted. A duplicate 7-horsepower oil engine was procured and soon will be placed. Various repairs were made.

245. Little Gull Island, New York.—The old second-class steam siren in duplicate was replaced by a second-class automatic siren in duplicate, consisting of two 13-horsepower oil engines, with two air tanks, two sirens, and an automatic signal. With the establishment of the new signal the characteristic was changed to sound blasts of 3 seconds duration, separated by silent intervals of 17 seconds. Complaint having been made by vessel men that the new signal was not loud enough, larger trumpets were furnished and a deflector was built on the roof of the fog-signal house. A series of experiments and tests were made and will be continued with a view to a further improvement of the sound.

248. Orient Point, New York.—The erection of the tower was completed and 803 tons of riprap was furnished and placed under contract. On November 10, 1899, a fixed red fifth-order light was established. On May 1, 1900, the fifth-order lens was replaced by a fourth-order lens. On June 1, 1900, a blower siren signal was established, consisting of two 2½-horsepower oil engines, a blower, a siren, and a trumpet, arranged to sound a continuous blast.

251. Greenport Harbor beacon, New York.—The oil house was replaced by a larger one.

256. Brockway West Channel (front) post light, Connecticut River.—A fixed white lantern light was established.

257. Brockway West Channel (rear) post light, Connecticut River.—A fixed white lantern light was established.

258. Joshua Rocks post light, Connecticut River.—This light was moved about 30 feet to the westward of its former position.

293. Duck Island beacon, Connecticut.—A fixed red post-lantern light was established. New burners were furnished and the oil house and post were repaired.

297. New Haven middle breakwater, east end beacon, Connecticut.—An additional white post-lantern light was established, 8 feet below the former light, on the post on the easterly end of the breakwater.

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299. New Haven outer breakwater, Connecticut.—The erection of this station by contract was completed. A fourth-order flashing red light and a second-class siren fog-signal were established, operated by a 13-horsepower oil engine and compressed air. Contract was made to furnish and place from 20,000 to 23,000 tons of riprap for the protection of the station, and about 13,781 tons were delivered.

300. New Haven long wharf, Connecticut.—It was decided to erect by contract a skeleton iron tower with a fog-signal and to provide a more efficient light. The erection of the tower was completed, a red lens-lantern light, and a fog-signal were established. The fog-signal consists of a 10,000-blow striking machine and a 160 pound bell to strike a blow every 10 seconds.

302. Housatonic River breakwater beacon, Connecticut.—A fixed red post lantern light was established on a shelf at the top of a red post on the southeasterly end of the breakwater.

305. Port Jefferson, east breakwater, beacon, New York.—An elevated walk was built on the breakwater for the convenience of the keeper. The fog-signal apparatus was overhauled and repaired. A lens lantern was substituted for the post lantern. Minor repairs were made.

309. Bridgeport breakwater, Connecticut.—About 1,000 running feet of plank walk was built, with railing on the breakwater for the protection of the keeper in attending the fog-signal, and to connect the station with the shore. Various repairs were made.

—. *Norwalk Harbor, Long Island Sound, Connecticut.*—The following recommendation, made in the Board's last four annual reports, is renewed:

It is also proposed to establish a light and fog-signal station on Pecks Ledge, Norwalk Harbor. It is estimated that this can be done for a sum not exceeding $10.000, and it is recommended that an appropriation of this amount be made therefor.

It is also proposed to establish a light on Long Beach day beacon, Norwalk Harbor. It is estimated that this work can be done for $2,500, and it is recommended that an appropriation of this amount be made therefor.

By the act approved March 3, 1899, an appropriation of $600 was made for establishing lighted beacons at Round Beach, Fitchs Point, White Rock Reef, and Grassy Hammock, Norwalk Harbor, Connecticut. It has been found that $1,000 will be required for the establishment of these beacons. An additional appropriation of $400 is therefore needed because since a special appropriation has been made for these beacons the general appropriations can not be expended for them. Recommendation is therefore made that the amount named be appropriated.

317. Greens Ledge, Connecticut.—Plans and specifications for the metal work and the erection of light-house are being printed.

327. Glencove breakwater beacon, New York.—A fixed white post lantern light was established, on a black post with a white top, on the breakwater, about 38 feet from its extreme westerly end.

331. Hart Island fog-signal, New York.—Efforts to obtain cession of jurisdiction or title to a site forth is fog-signal, for which an appropriation of $2,500 was made by act approved July 1, 1898, having failed, and owing to the impossibility of building the fog-signal with the amount appropriated, its construction was abandoned for the present.

338. North Brother Island, New York.—The intensity of this light was increased by substituting a fourth-order lens for the fifth-order lens then in use.

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340. Lawrence Point Ledge post light, New York.—A fixed white lantern light was established on the structure recently erected, to replace the one destroyed by ice.

348. Fire Island, New York.—A series of experiments in wireless telegraphy were made at this station by signal officers of the War Department, the use of the building and grounds being granted by the Light-House Board for the purpose. Various repairs were made.

367. North Hook beacon, New Jersey.—The removal of the fog-signal from in front of the 12-inch battery No. 3 to the east end of the gorge wall of Fort Hancock, including new building and transfer of machinery, was begun and is in progress. Various repairs were made.

370. Waackaack range beacon, New Jersey.—The present quarters for the light-keepers are inadequate. Recommendation was made in annual reports of 1896, 1897, 1898, and 1899, that either an addition to the old dwelling or new quarters be built. The Board is now of opinion that new quarters should be provided. It is estimated that this can be done for not exceeding $3,500, and it is recommended that an appropriation of this amount be made therefor.

376. Romer Shoal, New York.—The erection of the metal work of the main gallery was completed. The work of building the landing pier, 32 feet long, 10 feet wide, 11 feet high above mean low water, under contract was completed. Various repairs were made.

377. West Bank, New York.—The complete metal work for the foundation cylinder, which was to weigh 380,000 pounds, was received. The site for the light was determined. The work of erection under contract was begun and on June 30, 1900, the platform or landing for material was completed.

384. Fort Tompkins, New York Bay, New York.—This light was discontinued, as a war measure, on April 28, 1898, and was relighted on August 1, 1898. Owing to the construction of batteries, it was necessary to give part of the reservation to the War Department and to allow the War Department to move the stable, wagon shed, etc., to another part of the reservation.

385. Fort Wadsworth light and fog-signal station, New York.—The Board in its annual report for 1892, page 68, made the following statement:

> The light at Fort Tompkins at present is well back of the point it is intended to mark. It is therefore proposed to move it from there to an angle of the stone fort at Fort Wadsworth, where it will better serve as a mark to the channel leading directly into New York Harbor.

The Board in its annual report for 1895, page 64, and in its three preceding annual reports, made the following recommendation:

> The light at Fort Tompkins at present is well back of the point it is intended to mark. It is therefore proposed to remove it from there to an angle of the stone fort at Fort Wadsworth, where it will better serve as a mark to the channel leading directly into New York Harbor. A fog-signal at Fort Wadsworth would be of especial service to the large commerce going through the Narrows during thick weather. The fog bell at Fort Lafayette is serviceable to vessels bound to Coney Island, but it is too distant to be of much use to vessels using the other and more frequented side of the channel. The change will make it necessary to build a lantern and watch room on the salient of the fort and to place a fog-signal house and apparatus at the foot of the wall. It is estimated that these changes can be made for not exceeding $1,500, and it is recommended that an appropriation of this amount be made therefor.

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A battery for five high-power modern rifles is about to be completed and armed directly in the rear of the light-house. This fact makes it more important than before that this light should be removed.

An appropriation of $1,500 was made for moving the light to and establishing it and a fog-signal at Fort Wadsworth by act approved June 11, 1896.

The Board in its annual report for 1897, page 62, stated:

An appropriation of $1,500 was made by the act approved June 11, 1896, for the removal of this light to the stone fort known as Fort Wadsworth and for the establishment of a fog-signal. As the amount appropriated is not sufficient to carry out the contemplated work, it has been decided to defer the removal of the tower and to ask authority of the War Department to establish a temporary fog bell on or near the sea wall outside the stone fort.

The Board in its annual report for 1899, page 75, stated:

The consent of the War Department having been obtained, a fog bell with striking apparatus was established May 16, 1898, on the easterly angle of the sea wall at Fort Wadsworth, and a balance of $696.34 was left of the $1,500 appropriated.

The contiguous site for the light-house buildings, which had been selected with the consent of the War Department before the war with Spain, it was now ascertained, could not be had, as its use would interfere with the existing plans for defense, so a new site had to be found. One was finally selected with the consent of the War Department, but it was so far back that the buildings could not be moved from the old site and reerected on the new site except at much larger expense than had been originally proposed. It is now estimated that to move the light-house buildings from Fort Tompkins and to erect them at Fort Wadsworth on the newly selected site will cost, in addition to the $696.34 available, about $10,200 more. The Board therefore recommends that an appropriation of $10,200 be made, in addition to the balance of $696.34, for the purpose mentioned.

The Board now estimates that, as prices are at the present time, $12,900 will be required for this work, and recommends that an appropriation of that amount be made therefor.

389. Governors Island post light, New York.—The intensity of the lights was increased by substituting lens lanterns for post lanterns. At the same time, the height of the upper light was increased to 75 feet above mean high water and the vertical distance between the two lights was increased from 10 to 15 feet. The improved blower siren fog-signal which is to replace the bell signal is being made ready and will be installed at an early date.

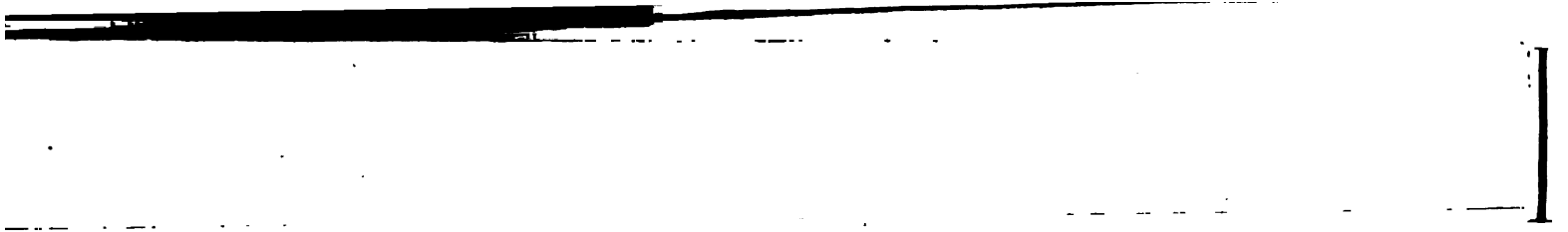
390. Governors Island (east end), New York.—A fog bell signal was established on the quartermaster's dock, consisting of a 10,000-blow striking machine, with a 160-pound bell arranged to strike a single blow every ten seconds.

406. Jeffreys Hook post light, Hudson River, New York.—Permission has been obtained from the department of public parks of New York City to occupy the necessary site for a fog-signal and a more powerful light, which are urgently needed at this point. The estimated cost of establishing the proposed light and fog-signal is $1,400.

The following recommendation, which was made in the Board's last five annual reports, is renewed:

A larger light and a fog bell here would be valuable aids to navigation. The point extends well out into the river, with deep water close to its outer end. The usual route of steamers passing up or down the river is close to the point. The present post light should be replaced by a new structure, upon which should be the lantern with the bell below.

It is estimated that these can be established for not exceeding $1,400, and it is recommended that an appropriation of this amount be made therefor.



Third District.

. *Iona Island, Hudson River, New York.*—The following recommation, made in the Board's last four annual reports, is renewed:

post light at this station is of no service during thick weather. A fog-signal ded during fog, in addition to the light, by the important commerce of this It is estimated that a fog-signal can be established here for a sum not ing $1,200, and it is recommended that an appropriation of this amount be therefor.

. *Esopus Island, Hudson River, New York.*—The matter of ning title to the site for this light and the proposed fog-signal is in the hands of the United States attorney.

8. *Rondout North Dike post light (end), Hudson River, New .*—The intensity of this light was increased by substituting a lantern for the post lantern. At the same time the height of the l plane of the light was increased 9 feet.

8. *New Baltimore Rock post light, Hudson River, New York.*— xed white lantern light was established on a dolphin in the water.

REPAIRS.

Repairs more or less extensive were made at the following-named tions:

. Sakonnet, R. I.
. Castle Hill, R. I.
. Fort Adams fog-signal station, R. I.
. Lime Rock, R. I.
. Newport Harbor, R. I.
. Newport Harbor, buoy wharf, R. I.
7. Rose Island, R. I.
0. Prudence Island, R. I.
3. Muscle Bed Shoals, R. I.
6. Whale Rock, R. I.
9. Wickford Harbor, R. I.
0. Conimicut, R. I.
0. Point Judith, R. I.
1. Block Island (North), R. I.
14. Block Island (S.E.) light-station, R. I.
215. Great Salt Pond Breakwater (outer end) Beacon, R. I.
217. Watch Hill, R. I.
219. Stonington Breakwater, Conn.
220. Latimer Reef, N. Y.
249. Long Beach Bar, N. Y.
250. Cedar Island, N. Y.
252. Saybrook Breakwater, Conn.
253. Saybrook Point, Conn.
294. Falkner Island, Conn.
296. Southwest Ledge, Conn.
304. Stratford Shoal (Middle Ground), N. Y.
307. Old Field Point, N. Y.
310. Black Rock, Conn.
311. Penfield Reef, Conn.
318. Eatons Neck, N. Y.
319. Lloyd Harbor, N. Y.
320. Cold Spring Harbor, N. Y.
321. Stamford Harbor, Conn.
324. Great Captain Island, N. Y.
329. Execution Rocks, N. Y.
333. Throgs Neck, N. Y.
334. Whitestone Point post light, N. Y.
342. Hell Gate post light, N. Y.
346. Shinnecock Bay, N. Y.
354–355. Navesink, N. J.
—. Sandy Hook electric buoy station, N. J.
370. Waackaack Range Beacon, N. J.
373. Conover Beacon, N. J.
374. Chapel Hill, N. J.
375. Old Orchard Shoal, N. Y.
383. Coney Island, N. Y.
385. Fort Wadsworth fog-signal, N. Y.
386. Fort Lafayette fog-signal, N. Y.
387. Robbins Reef, N. Y.
388. Liberty Enlightening the World, N. Y.
397. Princess Bay, N. Y.
402. Bergen Point, N. J.
407. Tarrytown, N. Y.
408. Rockland Lake, N. Y.
409. Stony Point, N. Y.
412. West Point, Hudson River, N. Y.
413. Danskammer Point, Hudson River, N. Y.
415. Esopus Meadows, Hudson River, N. Y.
416. Rondout, Hudson River, N. Y.
421. Saugerties, Hudson River, N. Y.
430. Four-Mile Point, Hudson River, N.Y.
436. Stuyvesant, Hudson River, N. Y.
1. Maxfield Point, Vt.
6. Isle La Motte, N. Y.
10. Cumberland Head, N. Y.
19. Juniper Island, Vt.
20. Split Rock, N. Y.
21. Otter Creek, Vt.
22. Barber Point, N. Y.

Third District.

PORTO RICO.

On May 1, 1900, the Light-House Board was directed to take charge of the Porto Rican light-house service. The Board, with the approval of the Secretary of the Treasury, at its session of May 7, 1900, ordered that—

> the boundaries of the Third light-house district be extended so as to include within it the island of Porto Rico and the adjacent islands and the waters of the islands lying east of the seventy-fourth meridian of longitude west of Greenwich, which were ceded to the United States by the Government of Spain by treaty entered into on the 10th day of December, 1898.

A lieutenant of the United States Navy was stationed at San Juan, P. R., and assigned to duty as assistant to the inspector of the Third district. He secured office room at the naval station in San Juan, and two clerks and a messenger were placed under his orders. A buoy depot and a store for supplies were temporarily provided, and the U. S. steam tug *Uncas* was assigned, when not otherwise employed by the Navy, for buoy service and delivering supplies and materials for building and repairs at the fifteen Porto Rican light-stations.

The officer of the Corps of Engineers who, as president of the board of works under the insular government of Porto Rico, had charge of the construction and repair of the Porto Rican light-houses was made assistant to the engineer Third light-house district and continued his duties under the direction of the Light-House Board. Both these officers were made disbursing officers by order of the President of the United States, so that payments could be made on the spot.

The Porto Rican buoy service was in poor condition. A supply of buoys and appendages and paints was shipped to San Juan. A quantity of light-house supplies, including rations and boats for the more isolated stations, is in preparation at the general light-house depot and will be sent in due time. Preliminary measures were taken so that the work of assimilating the Porto Rican light-house service to the general Light-House Service will be completed.

Each Porto Rican light-house received minor repairs to buildings and illuminating apparatus. The few damages inflicted by the hurricane were repaired.

1117. Morro, San Juan, P. R.—Extensive repairs were made to Morro light, which had been rendered unserviceable by the American bombardment.

1128. Mona Island, Porto Rico.—On this island, which lies midway between Porto Rico and Santo Domingo, in the Mona Passage, the Spanish Government had deposited near the beach a large quantity of material for the erection of two large steel buildings for keepers' dwellings and a steel tower to support the light. During the several years that this material was stored it became much rusted and many parts disappeared. The American military government determined to erect this light, and selected a site. Little had been done on October 1, 1899, when the Porto Rican board of public works assumed charge. The work was carried on under great difficulties, due to the lack of transportation facilities and the frequent impossibility of effecting a landing for days at a time, there being no harbor at Mona. The materials on hand, which existed in heavy parts, had to be transported a mile over a rocky service so rough that much ballasting and blasting were necessary. The light-house proper was completed and the light service inaugurated on April 30, 1900, at which time about three months'

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work remained to be done to complete the station. The light is of the second order. It is visible about 22 miles and it will doubtless be of great service to mariners.

The completion of Puerto Ferro and Mona lights makes 15 the total number of lights in Porto Rico.

The light-house work of construction and maintenance was delayed by the lack of a tender. The light-stations are generally inaccessible, 6 being located upon outlying islands.

Since May 1, 1900, the assistant to the engineer, Third light-house district, has opened an office and organized a field force. The construction of Mona Island light-house was continued with funds from the appropriation "Repairs of light-houses, 1900," and from the appropriation of $60,000 made by the act approved June 6, 1900, for the Porto Rican light-house service.

LIGHT-HOUSE CONSTRUCTION.

Light-houses arranged in order of construction, showing dates when commenced and finished, and estimated cost.

Name of light.	Begun.	Finished.	Valuation by Spanish at time of evacuation, based on cost.
			Pesos.
Morro		1870	
Do	[1]	1875	
Cabezas de San Juan (Fajardo)	1878	1880	16,300
Cabo Rojo	1878	1882	14,900
Cardona	1887	1889	11,760
Culebrita	1882	1885	39,000
Caja de Muertas	1883	1887	39,412
Borinquen	1888	1889	30,870
La Tuna	1891	1893	26,500
Jiguero	1891	1892	12,361
Guanica	1892	1893	14,900
Figuras	1892	1893	18,300
Mulas	1895	1896	14,500
Arecibo	1896	1897	27,219
Puerto Ferro	1896	1899	20,000 [2] $4,697.65
Mona	1888	1900	56,088 [3] $22,390.46

[1] Reconstructed.
[2] Completed since American occupation.
[3] Including estimate to complete since American occupation.

LIGHT-VESSELS.

181. Brenton Reef light-vessel, No. 39, entrance to Narragansett Bay, Rhode Island.—This wooden vessel was built in 1875. She is of 387 tons gross burden, and has a steam fog-signal. She was brought in for repairs July 25, 1899, having been replaced by relief light-vessel No. 20, and was returned to her station March 8, 1900. In these repairs two new boilers were installed, the whistle engine and pumps were overhauled, the vessel was recalked, remetaled and painted throughout, an oil house was built on deck, and eight new water tanks were put in. She received paints, ship chandlery, and engineer's stores.

192. Hog Island Shoal light-vessel, No. 12, Narragansett Bay, Rhode Island.—This wooden vessel was built in 1846, is of 150 tons gross

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burden, and has a bell for a fog-signal. She was withdrawn for repairs on November 1, 1899, the tender *Cactus* taking her place, and was in three days returned to her station. She received during the year medicines, ship chandlery, and tableware.

221. Ram Island Reef light-vessel, No. 23, Fishers Island Sound, New York.—This wooden vessel was built in 1857, is of about 186 tons gross burden, and has a bell for a fog-signal. The vessel received during the year only minor repairs, such as patching copper, calking, and mending sails, boats, awnings, and rigging, and these repairs were made by the crew. She received cooking utensils, ship chandlery, tableware, and incidental supplies.

243. Bartlett Reef light-vessel, No. 13, off New London, Long Island Sound, Connecticut.—This wooden vessel was built in 1854, is of about 155 tons gross burden, and has a bell for a fog-signal. She is kept in serviceable condition. She received ship chandlery, fuel, rations, and miscellaneous stores.

291. Cornfield Point light-vessel, No. 48, off the mouth of the Connecticut River, Long Island Sound, Connecticut.—This composite light-vessel was built in 1890–91, is of 295 tons gross burden, and has a steam whistle for a fog-signal, and a flashing white light made by revolving lanterns at the foremast. The light at the mainmast is fixed red. The vessel was brought in for repairs on June 2, 1899, was returned to her station July 15, and relief light-vessel No. 20, which temporarily marked the station, was withdrawn. Her copper was replaced where ice had torn it off; her windlass received new wild-cat and other parts; her pumps and sea cocks were overhauled; soft patches were put on both boilers; steam and exhaust pipes were renewed, and new pipes were placed in the fire-room floor. She was painted inside and outside throughout. On October 31, 1899, during an easterly gale, she parted her cable and drifted until brought up with anchor and chain one-fourth mile west of her station. She was returned on the next day to her station by the tender *Gardenia*. In this accident she lost one mushroom anchor and 60 fathoms of chain. On February 23, 1900, she was fouled by the barge *Island Home*, in tow of the tug *Teaser*, of Boston. There was a fresh southwest breeze and a strong ebb tide at the time. The light-ship was struck on the starboard side of the stern, which had about 4 feet of it knocked out, and was split down to below the water line, causing her to leak when riding hard. She was brought in on April 5, 1900, and relief light-vessel No. 20 was put in her place. On May 28, 1900, she was taken for repairs to Greenport, N. Y., where she is now receiving a general overhauling.

347. Fire Island light-vessel, No. 68, off Fire Island, Atlantic Coast of Long Island, New York.—This steam, steel light-vessel was built in 1897, is of about 451 tons gross burden, and shows a fixed white incandescent electric light from each masthead. During the year, including the storms and seas of a severe winter, she was free from collisions or accidents of any kind. The hardest work the tenders of this district do is to furnish this light-vessel with coal and other supplies, some 40 miles to seaward of Sandy Hook.

352. Sandy Hook light-vessel, No. 51, off the entrance to New York Bay, New York.—This steel, steam, self-propelling light-vessel was built in 1892, and is of 283 tons gross burden. She was brought in for repairs on May 15, 1899, and was returned to her station on August 23,

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1899, when relief light-vessel No. 11, which had been in her place was removed. This light-vessel was placed in dry dock, when her bottom was cleaned and painted, her main deck calked, and necessary repairs to hull and engine were made. The old dynamos were taken out and were replaced by dynamos of the Crocker-Wheeler type, driven by Sturtevant engines, which resulted in an appreciable reduction in the quantity of coal burned. After the installation of the new dynamos the lights were not extinguished by failure of the plant. She received a new awning, oils, paints, engineer's stores, and the other incidental supplies.

353. Scotland light-vessel, No. 7, off Sandy Hook, entrance to New York Bay, New York.—This wooden light-vessel was built in 1854, is of 142 tons gross burden, old measurement, and has a bell for a fog-signal. She was withdrawn for repairs on August 23, and was returned to her station on October 19, 1899. The repairs consisted in patching the metal sheathing, renewing and strengthening the rail in parts, putting the lanterns, ventilators, and hatches in good order, stopping a leak, and making sundry renewals and changes in winches, skylights, cabin, forecastle, and other parts of the ship. She received during the year cordage, paints, ship chandlery and incidental supplies.

Relief light-vessel No. 20.—This wooden vessel was built in 1867, is of 105 tons gross burden, and has a bell for a fog-signal. She is kept at the New London Light-House depot to relieve light-vessels in Long Island Sound. She was placed on Cornfield Point station on June 21, 1899, where she relieved light-vessel No. 48, brought in for repairs; she was withdrawn on July 15, 1899, when the regular vessel was returned to duty. She again relieved light-vessel No. 48, at Cornfield Point, April 5, 1900, and is still there. She was injured June 23, 1900, by the collision of a barge in tow of the steamer *Wrestler*, of Boston, Mass.

Relief light-vessel No. 16.—Kept in reserve at the light-house depot, Staten Island, New York. This wooden light-vessel was built in 1854, is of 250 tons gross burden, and has a steam fog-signal. She is kept ready to relieve either light-vessel No. 51, off Sandy Hook, or light-vessel No. 68, off Fire Island. After service in the Fourth and Fifth districts, she was returned to this district December 22, 1899. She is now under contract to be thoroughly overhauled.

Relief light-vessel No. 19.—This wooden vessel is kept at the New London Light-House depot. She was built in 1845, is of 150 tons gross burden, and has a bell for a fog-signal. She was condemned several years ago and is not worth repair.

Relief light-vessel No. 11.—This wooden vessel was built in 1853, is of 320 tons gross burden, and has a bell for a fog-signal. On May 17 she relieved Sandy Hook light-vessel No. 51, and was withdrawn on August 23, 1899. On the same date she relieved Scotland light-vessel No. 7, off the entrance to New York Bay, and on October 19, 1899, she was brought back to the general light-house depot.

DAY OR UNLIGHTED BEACONS.

All the day beacons in the district have been painted.

47. Twenty-six Foot Channel range, East River, New York.—This is a white post surmounted by a white target 3 feet square and having a square black center. It was established on December 15, 1899.

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FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

181. Brenton Reef light-vessel, No. 39, Rhode Island.—The two steam whistles, 6-inch and 12-inch, were in operation about 131 hours and consumed some 27 tons of coal.

182. Beavertail, Rhode Island.—This 10-inch steam whistle in duplicate, with automatic signals, was in use until November 10, 1899, was in operation about 254 hours and consumed some 20 tons of coal. The second-class automatic signal in use since then was in operation about 325 hours and consumed some 855 gallons of oil.

200. Conanicut, Rhode Island.—This blower siren, worked by a 2½-horsepower oil engine, was established on June 30, 1900.

202. Warwick, Rhode Island.—This blower siren, worked by a 2½-horsepower oil engine, was established on June 1, 1900.

207. Pomham Rocks, Rhode Island.—This blower siren, worked by a 2½-horsepower oil engine, was established on June 30, 1900.

210. Point Judith, Rhode Island.—This first-class steam siren, in duplicate, was in operation about 609 hours and consumed some 61 tons of coal.

214. Block Island (SE.), Rhode Island.—This first-class steam siren, in duplicate, was in operation about 714 hours and consumed some 46 tons of coal.

215. Great Salt Pond (Outer End), Rhode Island.—This blower siren, worked by a 2½-horsepower oil engine, was in operation about 309 hours and consumed some 119 gallons of oil. Owing to damage to the breakwater the signal was temporarily discontinued on March 8, 1900.

218. Montauk Point, New York.—This first-class siren, in duplicate, operated by 10-horsepower oil engines and compressed air, was in operation about 571 hours and consumed some 940 gallons of oil.

224. New London Harbor, Connecticut.—This first-class Daboll trumpet, worked by 3½-horsepower oil engines, in duplicate, was in operation about 638 hours and consumed some 290 gallons of oil.

244. Race Rock, New York.—This second-class siren, worked by a 7½-horsepower oil engine and compressed air, was in operation about 509 hours and consumed some 502 gallons of oil.

245. Little Gull Island, New York.—This second-class steam siren, in duplicate, in use up to January 21, 1900, was in operation about 210 hours and consumed some 12 tons of coal. The second-class automatic siren, in duplicate, operated by 13-horsepower oil engines and compressed air, in use since then, was in operation about 372 hours and consumed some 785 gallons of oil.

248. Orient Point, New York.—This blower siren, worked by a 2½-horsepower oil engine, in duplicate, was in operation about 39 hours and consumed some 10 gallons of oil.

291. Cornfield Point light-vessel, No. 48, Connecticut.—This 12-inch steam whistle was in operation about 514 hours and consumed some 105 tons of coal.

294. Falkner Island, Connecticut.—This 10-inch steam whistle, in duplicate, was in operation about 423 hours and consumed some 39 tons of coal.

296. Southwest Ledge, Connecticut.—This second-class Daboll trumpet, operated by 3½-horsepower oil engines, in duplicate, was in operation about 369 hours and consumed some 195 gallons of oil.

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299. New Haven Outer Breakwater, Connecticut.—This second-class automatic siren, in duplicate, worked by 13-horsepower oil engines, was established on June 30, 1900.

304. Stratford Shoal (Middle Ground), New York.—This second-class Daboll trumpet, worked by 3½-horsepower oil engines, in duplicate, was in operation about 383 hours and consumed some 175 gallons of oil.

311. Penfield Reef, Connecticut.—This second-class Daboll trumpet, worked by 3½-horsepower oil engines, in duplicate, was in operation some 392 hours and consumed about 169 gallons of oil.

318. Eatons Neck, New York.—This second-class steam siren, in duplicate, was in operation about 529 hours and consumed some 39 tons of coal.

324. Great Captain Island, New York.—This 10-inch steam whistle, in duplicate, with Crosby automatic signal, was in operation about 428 hours and consumed some 47 tons of coal.

329. Execution Rocks, New York.—This first-class automatic steam siren, in duplicate, was in operation about 339 hours and consumed some 53 tons of coal.

347. Fire Island light-vessel, No. 68, New York.—This 12-inch steam chime whistle was in operation about 540 hours and consumed some 111 tons of coal.

352. Sandy Hook light-vessel, No. 51, New York.—This 12-inch steam whistle was in operation about 558 hours and consumed some 81 tons of coal.

367. North Hook Beacon, Sandy Hook, New Jersey.—This first-class automatic steam siren, in duplicate, was in operation about 1,040 hours and consumed some 67 tons of coal.

375. Old Orchard Shoal, New York.—This blower siren, operated by a 2½-horsepower oil engine, was in operation about 746 hours and consumed some 242 gallons of oil.

387. Robbins Reef, New York Harbor.—This blower siren, worked by a 3½-horsepower oil engine, was in operation about 338 hours and consumed some 157 gallons of oil.

BUOYAGE.

The special feature of the winter 1899–1900 was the variable weather which it presented. There was much ice in the different channels, which was heavy enough to suspend navigation, though not permanently nor for long periods at a time. The intervals of open water, however, were so short that the iron buoys, taken up in December to save them from running ice, were not returned to their stations until the latter part of March. There was a break up of the ice fields seven to eight times within a few weeks, but the thaw in each case did not last long. It was not found practicable to keep in place even the bell buoys, which, owing to their low metacenter when tipped over, right themselves after the removal of pressure of ice more readily than can nun or can buoys. In this exigency, the port-hand channel or ice buoys were put down for experiment, and proved to be more successful as winter buoys than any form of buoy heretofore used. The shape of the ice buoy is cylindrical for 5 feet on top, and conical for 15 feet 8½ inches, or the remainder of its length. Above the water line it shows like a second-class can buoy. Like the bell buoy it goes

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under the water before ice pressure and regains its equilibrium when relieved. The number of buoys and appendages lost during the year was comparatively small. A large loss of iron can and nun buoys occurs when it is attempted to keep them in position against floating ice. New buoys were placed in Port Jefferson Harbor, Arthur Kill, Raritan Bay, Mount Hope Bay, Hudson River, Sandy Hook Bay, and Narragansett Bay, and fourteen wrecks in different parts of the district were marked by appropriate buoys. During the season of running ice the tenders did patrol duty, so that when buoys disappeared, the tenders recovered and replaced them without delay. The beacons and buoys of the district are comprehensive as channel markers and are generally in good condition.

ELECTRIC BUOYS.

Suspension of the entire system of electric lighted buoys in New York lower bay took place seven times during the year. It was in four instances due to the collision of passing vessels, and, in the other three, to submersion by running ice. The longest period of the extinction of all the lights was, with the exception of two short relightings, from February 2 to February 26, and from March 5 to March 9, 1900. Since then there has been no protracted suspension of the lights. The operation of the system when free from disturbing causes, has been efficient and satisfactory. The lights were extinguished by various causes as follows:

E. 1.—Buoy water soaked; new buoy furnished. Two lamps broken. Extinguished two nights; once due to defect in cable.

E. 2.—Its head was burned off and was replaced by a new buoy and transformer. It was broken off by a vessel, and was again replaced by a new buoy and transformer. It was extinguished one night by a collision.

E. 3.—The head was burned off during a high sea, a condition favorable to this kind of accident. It was replaced by a new buoy and transformer. The lamp was broken by a vessel.

E. 4.—The lamp was broken by a vessel. For three nights it was extinguished by defects in the cable.

E. 5.—Its head was burned off during a high sea. It was replaced by a new buoy and transformer. The lamp was broken by a vessel.

E. 6.—The head was burned off during a high sea. It was replaced by a new buoy and transformer. The lamp was broken by a vessel. It was extinguished by inherent defects.

E. 7.—The buoy became water soaked and was replaced by a new buoy and transformer.

E. 8.—The head of the buoy was burned off. It was replaced by a new buoy and transformer. The lamp was broken by a vessel. It was extinguished by defects in cable.

B. 2.—The head was burned off twice during high tides. It was replaced by a new buoy and transformer. The lamp was broken by a vessel. It was extinguished by trouble in the cable.

No. 12.—It was extinguished six nights by ice forming on the head of the buoy and preventing repairs. The buoy and lamp were destroyed by a vessel. It was replaced by a new buoy and transformer.

C. buoy.—On August 8, 1899, the cable feeding this buoy was

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removed to admit of dredging the main channel, and a gas lighted buoy was substituted.

The days on which all of the electric lighted buoys were running during the month, or were extinguished for causes, are stated as follows:

July, 1899.—All the lights were out on July 7 and 25, due to "burn outs" of buoys E. 7 and E. 8.

August, 1899.—All out August 20, by a burn out of E. 2, the high sea having it under water.

September, 1899.—All the lights in Gedney Channel were extinguished September 9 and 10 by a burn out of buoy E 1, caused by the cable getting under a sinker; and on September 28 and 30, due to fouling of the cable by a passing vessel, between the junction box and the beach.

October, 1899.—A vessel fouled the cable and broke it in three places between the junction box and the beach, extinguishing all the lights on October 1 and 2. Collisions of passing vessels put them out again on October 9 and 24.

November and December, 1899.—The system was undisturbed, and the lights, with occasional individual exceptions, were exhibited throughout that month.

January, 1900.—The lights were all out, due to fouling on January 7, and bad weather prevented repairs until three days later.

February, 1900.—The lights were extinguished for six nights, owing to heavy ice forming on the heads of the buoys and either destroying the transformers or submerging the buoys by its weight. The ice during this month, when the buoys were forced under, was particularly heavy.

March, 1900.—The lights were out from March 3 to 7, due to fouling of the cable. This was done by a steamship. In the collision the cable was pulled out of the junction box and broken at buoy E 7, and a burn out was caused near buoy E 3, so that 1,200 feet of cable were torn out and lost. Bad weather prevented a repair for many days.

April, 1900.—All the buoys ran smoothly during the month.

May, 1900.—With the exception of buoys E 1 and E 8, extinguished for a few nights, the system was in operation.

June, 1900.—There was no disturbance of the system.

NEW CABLE FURNISHED.

The collisions by passing vessels during the year were not as numerous as in previous years, and the damage in ruptures or burn outs, as shown in the preceding summary, was local, rather than general. It caused much work for the tenders, but for this reason the expenditure of new cable was small, and part of it was for improvement, not repair. It was as follows:

About 1,400 feet of copper armored cable was laid to replace the section destroyed by a steamship. Some 200 feet of cable was laid between the junction box and the beach, in place of a part broken and carried off. The part of the cable between the junction box and buoy E 7, about half a mile, was strained by fouling several times, and will have to be replaced at an early day. Two new cables were laid, one from the buoy station at Sandy Hook to the North Hook Beacon, to light the latter independently of the circuit for buoys, the other, consisting of 2,600 feet of copper armored cable to feed separately the lights on the northerly side of the channel, by restoring the fork ter-

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minal of the line in place of the loop terminal, which, to permit dredging, was put in early in the year.

REPAIRS AND CONDITION.

The station received during the year a new platform in front, a new plank walk between the dwellings, and new gutters and leaders.

Number of vessels using Gedney Channel, New York lower bay, between sunset and sunrise, in the fiscal year 1899–1900.

Fiscal year and month.	Bound in.	Bound out.	Total.
1899.			
July	46	19	65
August	47	17	64
September	37	28	65
October	47	22	69
November	67	45	112
December	73	46	119
1900.			
January	57	44	101
February	44	32	76
March	48	29	77
April	47	34	81
May	58	17	75
June	60	26	86
Total	631	359	990
Average per month	52.6	29.9	82.5

Synopsis showing the number of vessels using Gedney Channel at night since the installation of the electric buoy plant, November 7, 1888.

	Number of vessels.			Average per month.		
	Bound in.	Bound out.	Total.	Bound in.	Bound out.	Total.
1888–89 (seven months)	171	53	224	24.4	7.6	32
1889–90	377	192	569	31.4	16	47.4
1890–91	470	297	767	39.1	24.7	63.9
1891–92	533	252	785	44.4	21	65.4
1892–93 (ten months)	487	215	702	48.7	21.5	70.2
1893–94	648	347	995	54	28.9	82.9
1894–95	561	286	847	51	26	77
1895–96	542	238	780	45.1	19.9	65
1896–97	541	222	763	45.1	18.5	63.6
1897–98	545	235	780	54.5	23.5	78
1898–99 (eleven months)	599	372	971	54.5	33.8	88.3
1899–1900	631	359	990	52.6	29.9	82.5

DEPOTS.

Tompkinsville, Staten Island, New York.—This is the general depot for the Light-House Establishment, as well as the principal depot for the Third light-house district. The annual supplies for light-houses and light-vessels, and day beacons, and iron buoys and appendages for the entire service are purchased under contract, conformably to samples and specimens, stored at this depot, and prepared for delivery by the supply steamer *Armeria* to the stations on the Atlantic and Gulf coasts, or for shipment to the inland and western districts as freight. The supplies collected at this center include oils, wicks, chimneys, cleaning materials and implements, hardware, ship chandlery and engineer's stores. They are inspected or tested, as the case

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requires, before acceptance. The tests vary from chemical analysis to trial, by experts, in actual use. The supplies stored at the general depot are of a technical kind, being material or manufactures after a standard peculiar to the Light-House Service. The stock of them is maintained in quantity to meet the demands of the service whenever they are made. This fact imposes a system of foresight and preparation for which the general depot provides. On the depot grounds are stored and cared for, ready for use and shipment, buoys and appendages and chains and anchors of all kinds. The testing rooms in the lamp shop and laboratory are used, among other things, for testing oils, wicks, chimneys, and general supplies. The vessels of the district are repaired when practicable by the mechanics employed at the depot. The fire department of the depot is composed of the workmen of the depot and the crews of the vessels lying at the wharves, and is fully organized and equipped. The men are assigned to stations and drilled from time to time. The power house, electric plant, fire engines, and connections throughout are effective and well kept. The work done in the inspector's department embraces the receiving, storing, and shipping of supplies, buoys and appendages, ground tackle, ship chandlery, rations, and fuel; loading and unloading the supply vessel and the tenders; testing supplies and stores; repairing vessels and boats, sails, awnings, iron buoys and appendages, and doing carpenter, joiner, and blacksmith work. The condition of the depot in all its outdoor arrangements of roads, walks, sewers, and pavements, as well as in the arrangement of space and facilities for storage, is complete.

Statement of chain, buoys, and buoy appendages received at and shipped from the general light-house depot (inspector's department) during the fiscal year ending June 30, 1900.

Articles.	Received.	Shipped.	Total.
Gas buoys			8
Whistling buoys	7	9	16
Bell buoys	10	6	16
Can buoys	29	30	59
Nun buoys	20	33	53
Spar buoys	275	97	372
Ballast balls	339	135	474
Sinkers, iron and stone	354	155	509
Shackles and swivels	3,827	1,637	5,464
Shackle keys and rings	2,004	785	2,789
Chain, buoy ....fathoms..	3,831	3,509	7,340
Chain, light-vessel .....do.....	2,955	1,125	4,080
Mushroom anchors	25	18	43
Bells for buoys	24	13	37
Bells for light vessels	8	2	10
Disks for bell buoys	16	12	28
Steel striking balls	7	0	7
Bridle chains for bell buoys	3	6	9
Whistles for whistling buoys	15	14	29

Statement of boxes, packages, etc., containing supplies received at and delivered from the general light-house depot, Staten Island (inspector's department), during the fiscal year ending June 30, 1900.

	Boxes.	Bundles.	Barrels and kegs.	Packages and coils.	Cans.	Total.
Received	17,731	2,150	10,797	8,228	72,150	111,056
Delivered	12,813	5,180	9,293	9,200	78,530	115,016
Total	30,544	7,330	20,090	17,428	150,680	226,072

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Statement of quantity of mineral and lard oils received at and delivered from the general light-house depot, Staten Island (inspector's department), during the fiscal year ending June 30, 1900.

	Received.	Delivered.	Total.
	Gallons.	*Gallons.*	*Gallons.*
Mineral oil	394,435	394,265	788,700
Lard oil	1,586	1,525	3,111
Total	396,021	395,790	791,811

By the act June 6, 1900, an appropriation of $25,000 was made for continuing the construction of the sea wall, rebuilding wharves, dredging the basin, and repairs and improvements to buildings and grounds, and the erection of a new oil house and lamp shop. The following is a brief summary of the principal work done at the depot under the light-house engineer during the period covered by this report:

East face north sea wall.—This work was completed on August 13, 1899.

Continuation of south end of east face sea wall.—On July 13, 1899, the first cut stone of this wall, under contract, was placed. Up to and including July 31, 50 feet in length and 12 feet in depth of stone had been placed.

Northeast face wharf.—The metal work for this wharf, 479,271 pounds, was received, under contract, at this depot on October 24, 1899. On December 14, 1899, a contract was made for the erection of the wharf. The work of removing the old wharf, begun November 22, was completed and the metal work delivered to contractor on December 16. On same date the work of erection was begun. On February 23 the apron in front of sea wall was completed, and the work of planking the wharf was begun. On April 5 the entire work was completed. On April 30, 1900, the work of laying 425 running feet of flag walk and resetting the curb and gutters in front of the light-house grounds on Stuyvesant place was completed.

In addition to the foregoing, the general work of the depot, consisting in part of the following, has been carried on: The receipt, preparation, care, and shipment of material, stores, etc., for the general work of this and the other light-house districts; the repairs and alterations of the steamers, fog-signals, light vessels and stations, and their machinery and apparatus; the care and maintenance of the quarters, shops, buildings, fences, and grounds of the depot; the manufacture, the examination, and test of illuminating apparatus, from and for the various light-house stations and light-house districts, and from abroad; the preparation of new and the repair of old illuminating apparatus, clocks, revolving machinery, lanterns, lamps, burners, fog-signals, etc., for this and the other light-house districts; the manufacture and repair of oil-supply cans and boxes; the setting up and testing of improved fog-signals, oil and gas engines, gasoline, acetylene, and other apparatus, and experiments in connection therewith; the preparation of plans, drawings, and estimates for works, and a large quantity of other detail work.

The work of this and other light-house districts is constantly and rapidly increasing, both in volume and variety, to such an extent as

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to outstrip the facilities for production, and the result is that the orders exceed the capacity of the shops.

To meet the present and growing demands of the service in an economical and satisfactory manner, additional shop, storage room, and other facilities, urgently needed and here named in the order of their relative importance, are earnestly recommended:

New oil house, estimated cost $40,000
New coal shed, estimated cost 20,000

At present there is one brick oil house; its capacity is insufficient for the storage of the oil, consequently the excess has to be stored in the adjacent coal shed, an old frame structure; the other coal shed, of a capacity of about 300 tons, has to answer for the needs of the district, thus requiring frequent purchases of coal.

While coal is being delivered to the coal sheds and while it is being placed on the tenders the delivery of oil has to be suspended, and vice versa, on account of the buildings being adjacent and the vessels in each case occupying the dock room, causing delay and expense. If the coal shed is placed on the south dock, as proposed, and the new oil house on the site of the present two coal sheds, this difficulty will be overcome.

New lamp shop, estimated cost $50,000

The present lamp shop is so crowded with machinery and workmen that it is not practicable to increase the present force, which is inadequate to meet the demands of the service, so it often happens that important and urgent work has to be delayed for lack of facilities to attend to it. The lamp shop is also deficient in storage room, light, and ventilation, and during the winter months the men can not see to work properly. If a new lamp shop is built, the old one would afford excellent and ample storage room for the heavy lenses and other costly apparatus and material, some of which is now stored in the old storehouse, subject to danger from fire.

There are now no sufficient means of properly testing lens apparatus, and makeshifts must be employed. It is proposed to place a tower on the east end of the new lamp shop, in which the lenses can be tested and the effect seen from the sea.

Light-house inspector's carpenter shop and boathouse, estimated cost $6,000

This building is a frame structure and should be torn down and replaced by a brick building for security against fire; the present carpenter shop should then be taken down.

Blacksmith shop, removal of, estimated cost $1,000

This shop is in charge of the light-house inspector and is mostly used for repairs to buoys. It should be removed to the site now occupied by the light-house inspector's carpenter shop, where it would be more conveniently situated for handling buoys, etc., which are now landed and stored at that place, where most of the smith's work is done.

Buoy shed on north wharf, estimated cost $3,000

The proposed shed is to be covered with corrugated iron on the north and left open on the south side. Its purpose is to provide a place where buoys may be repaired and painted in any weather, and for storage of material.

Watch house, lower gate, estimated cost $2,500

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This is a frame building on brick foundation. It is proposed to replace the frame with a brick structure.

Watch house, upper gate, estimated cost..... $1,200

This also is a wooden structure. It should be replaced with a brick one.

Under annual appropriations the work of improvement of this important depot has been in progress for a number of years. The completion of this work is estimated at $123,700, and the Board recommends that the sum of $50,000 be appropriated for continuing the work during the next fiscal year.

List of boxes, barrels, bundles, cans, packages, etc., exclusive of lens apparatus, received at and delivered from light-house depot (engineer department) from July 1, 1899, to June 30, 1900.

	Boxes.	Barrels.	Bales, bundles, coils, packages, etc.	Kegs.	Cans.	Total.
Received	1,425	53	11,753	130	39	13,400
Delivered	928	213	4,967	57	99	6,264
Total	2,353	266	16,720	187	138	19,664

List of lens apparatus, etc., received at and shipped from general light-house depot, Staten Island, New York, by engineer Third light-house district, with number of cases in which received and shipped, from July 1, 1899, to June 30, 1900.

	Third order.	Fourth order.	Fifth order.	Lens lanterns, post lanterns, etc.	Total.
Received	2	8	2	259	271
Delivered		8	3	280	291
Total	2	16	5	539	562
Number of cases:					
Received	15	10	6	5	36
Delivered		40	3	222	265
Total	15	50	9	227	301

List of articles manufactured and repaired in lamp shop at general light-house depot, Staten Island, New York, under direction of the engineer Third light-house district, during the year ending June 30, 1900.

	Lenses.	Lens lanterns.	Post lanterns.	Lamps.	Burners.	Miscellaneous articles.	Oil cans.	Total.
Manufactured	9	84	131	448	553	2,678	17,551	21,454
Repaired	7	16	23	83	36	1,750	4,700	6,615
Total	16	100	154	531	589	4,428	22,251	28,069

New London, Conn.—This depot is used to supply the eastern section of the district. Some of the annual and most of the incidental supplies are stored here. The stock kept on hand includes buoys and appendages, lime, fuel, anchors, and light-vessel chain. The tender *Cactus*, stationed at this depot, is charged especially with the duty of

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supplying the stations and attending to the buoys and beacons eastward of New Haven, Conn., but she is called to the general light-house depot in seasons of emergency, for duty in the western section, and for like service the other tenders are sent east. Relief light-vessels Nos. 19 and 20 stationed here are cared for by one keeper. Light-vessel No. 20 is held here in readiness for service at short notice.

Goat Island, Newport Harbor, Rhode Island.—Fuel and lime for the stations in Narragansett Bay and vicinity are supplied from here, as are the anchors and chains and buoys and appendages required for the floating aids to navigation. The tenders working in the neighborhood receive here their supplies of fuel. Temporary repairs were made during the past year.

Juniper Island, Lake Champlain, Vermont.—This depot is for the light-house service on Lake Champlain. It consists of a small storehouse on the island for boats, building materials, and supplies. The wharf is commodious and serves as a landing and for storing buoys. The annual supplies furnished from the general light-house depot are delivered here by the tender *Daisy*, in a special trip, made through the Hudson River Canal, to all the stations between Whitehall and Rouse Point, N. Y.

SUPPLY STEAMER.

Armeria.—This steel screw steamer was built in 1889–90, and is of 634 tons burden. During the past year she made three voyages. In the first she supplied all the light-stations from St. Croix River, Maine, to Robbins Reef, New York. In the second she supplied all the stations from Cape Lookout, North Carolina, to Point Isabel, Texas, and in the third, all stations from Portsmouth, Va., to Fire Island, New York, including those in Chesapeake and Delaware bays, and Hudson River. She delivered 261,900 gallons of mineral oil, 7,393 boxes of chimneys and chimney materials, 13,621 packages of miscellaneous supplies, and 197 tons of paints, oil, turpentine, and driers. To the light-house district depots the *Armeria* delivered 321 tons of chain, sinkers, ballast balls and shackles, and 1,584 packages of incidental supplies. As extra duty, she changed the sea buoys off St. Augustine, Mosquito Inlet, and Cape Canaveral, Florida, and Fire Island, New York, and did buoy work at Galveston, Brazos River, and Brazos Santiago, Texas. She conveyed the inspector of the Eighth district to inspect light-stations on the coasts of Louisiana and Texas, and made a special trip from South Pass, Louisiana, to Horn and Round islands, Mississippi. In doing this work the *Armeria* steamed about 16,180 miles and consumed some 1,305 tons of coal. She was hauled out on a dry dock once, when her bottom was cleaned and painted, and she received certain articles of supply and equipment.

TENDERS.

John Rodgers.—This iron, side-wheel steamer was built in 1883, and is of 260 tons gross burden. She was employed throughout the district, except for 25 days, when she was laid up for repairs, when a new boiler was put in, and new parts to engine, wearing pieces, and plumbing were supplied. She changed or replaced 185 buoys, established 5 new ones, and recovered 3; cleaned and painted 255 spar buoys, 11 gas buoys, 16 bell buoys, and 82 can and nun buoys. She repaired the electric buoys in Gedney Channel 24 times, and changed

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10 of them at different times. She was engaged on tours of inspection 20 days, transferred loads of buoys and appendages to the subdepots, filled gas buoys as required, and shipped freight to transportation lines. She delivered rations, 610 packages of supplies, 350 gallons of mineral oil, 744 tons of coal, and 4 cords of wood. She performed work at the general depot for 28 days, preparing shipments, stowing buoys, filling coal, and fitting out light-vessels for temporary or permanent service. She helped also to put up smoke pipes and make sundry repairs at the electric-buoy station, Sandy Hook. In doing this work, she steamed about 6,842 miles, and consumed some 529 tons of coal. She received electrical apparatus, engineers' stores, furniture, paint, crockery, pumps, and steering gear.

Gardenia.—This wooden, screw steamer, purchased in 1888, is of about 150 tons gross burden. She was constantly employed, except for 6 days, when she was laid up for repairs. She visited 95 stations for inspection. She changed or replaced 496 buoys, and cleaned and painted 291. She delivered 7,425 gallons of mineral oil and 2,773 packages of supplies, and shipped 1,439 packages of freight to the various transportation lines. She served for 64 days doing work at the general depot; attended light-vessels, changing moorings and towing, 13 days; moved keepers and their effects as required; rescued crew of a sinking vessel, and delivered rations to the shore stations. In doing this work she steamed about 9,545 miles, and consumed some 490 tons of coal. She was hauled out to receive a new propeller; received repairs to boiler and machinery, and was painted outside. She is now undergoing extensive repairs to hull, companion way, boiler, and machinery. She received during the year cleaning materials, paints, tableware, medicines, and ship chandlery.

Cactus.—This wooden, side-wheel steamer, of about 200 tons gross burden, was purchased in 1865. She is now receiving a new boiler. She is chiefly employed in supplying the stations and attending the buoys in the eastern section of this light-house district. She was engaged in moving and placing light-vessels 14 days; transferring keepers 5 days; attending electric buoys, policing depot, and removing wreckage, 10 days. The *Cactus* placed 6 new buoys, recovered 9, changed or replaced 189, and painted 273, and painted all the day beacons in her section. She visited for inspection 162 stations, delivered 6,306 packages of supplies, 4,460 gallons of oil, 507 tons of coal, 40 cords of wood, 57 annual rations, and 34 barrels of lime. She was laid up for repairs 43 days. She ran about 9,663 miles, and consumed some 540 tons of coal. She received during the year engineers' stores, cleansing materials, ship chandlery, and paints. Her bottom was calked and metaled where needed, her wheelhouse received new batteries, sponses, and cleats; new wearing pieces were put in guard; the boiler was patched; the engine received a piston rod, crank pin, and brasses, and the steam steerer was overhauled.

Daisy.—This wooden, screw steamer, purchased in 1892, is of about 25 tons gross burden. She is principally engaged in the shipment of freight, transportation, delivery of annual supplies on Lake Champlain, and incidental supplies in small quantities elsewhere; marking wrecks; patrol duty; inspection, and the like. For light, quick service of this kind, she is handy and well equipped. She was 64 days on tours of inspection; cleaned and painted 99 buoys; delivered 1,261 packages of supplies and 12,010 gallons of mineral oil; made 34 ship-

ments of freight, repaired electrical buoys several times, transported men and materials to light-stations 10 times, assisted for 10 days in work at the general light-house depot, placed and replaced numerous small buoys, attended gas buoys and lights on wrecks, supplied the light-stations on Lake Champlain, going for the purpose through the Hudson River Canal. The *Daisy* steamed about 4,145 miles, and consumed some 118 tons of coal. She was laid up for repairs 6 days in all. She received during the year engineers' stores, packing, cooking utensils, and crockery.

Mistletoe.—This wooden, side-wheel steamer, of about 353 tons gross burden, was built in 1872. She was furnished with a boom for the hoisting derrick and 6 oak side fenders. The old metal sheathing was removed, the hull was recalked to the guards, the seams were payed with pitch, felting was fitted and the hull was resheathed with new metal. About 90 feet of old shoe was replaced by new; the keel was trimmed and the sponson struts were removed. Some 270 screw stay bolts in the boiler were replaced by driven socket bolts, and the seams of the boiler were calked. The engine was lined up; the lower steam valve was ground in, and the steam windlass was overhauled. The steering gear, the woodwork of the paddle boxes, and the upper railing of the deck were repaired. The cabin pilot house and chart room were painted. With the exception of the time occupied with these and some minor repairs, she was almost continually employed in inspection, construction, repairs and maintenance of the lights, signals, beacons, and other aids, and in the freighting and shipment of stores, material, apparatus, etc., in the performance of which duties she steamed about 926 hours, making 7,884 miles, with a consumption of about 413 tons of coal, an average of 1,000.5 pounds for each hour of steaming.

Rose.—This wooden, screw steamer, of about 107 tons gross burden, built in 1873, having become rotten and worn out, was, on September 25, 1899, sold—without mast and hoisting engine—at auction.

Nettle.—This wooden, screw steam launch was built in 1878 and is of about 22 tons gross burden. Some 51 new tubes were put into the boiler and 4 rivets in stiffening rings fitted; the boiler was scaled, the back connections were calked, two new hand-hole plates and new bridge walls were fitted. From August 22 to September 9 she was engaged in inspection and repair in the Hudson River, Whitehall Narrows, and Lake Champlain, and occasionally, up to December 14, in duties in New York Bay and adjacent waters, where a larger vessel could be neither economically nor advantageously used, if at all. In the performance of these duties she steamed about 410 hours, making, say, 2,612 miles, with a consumption of about 50 tons of coal, an average of 271.6 pounds for each hour of steaming.

On December 14, 1899, she went out of commission, her boiler being in bad condition. On March 2, 1900, two bids, respectively $1,240 and $1,925, to furnish new boiler and water tanks, were received in response to proposals invited by Board authority of February 1, 1900. On June 5 the vessel was taken to a dock to receive her boiler and tanks. With these installed, as her hull is in good condition, she will be a useful boat. It is proposed to place her in commission, with a permanent crew, for service on the lake and rivers, where she will be used in freighting and other lighter though important duties of

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the district in this vicinity, for which duties she is so well adapted by her light draft and small size.

Iris.—By act approved March 3, 1899, an appropriation of $85,000 was made for a new tender for construction and repair work in this district. As the need of the tender was too urgent to admit of the delay consequent upon the building of the vessel, it was deemed expedient, as a matter of economy and for the best interests of the service, to purchase one of several suitable vessels offered for sale. The steamer *Plymouth*, a steel, screw steamer built in 1897, of 428 tons gross burden, was finally decided to be the most suitable vessel, and December 13, 1899, she was purchased, fully equipped, for the sum of $77,500. On December 18, 1899, her name was changed to *Iris*, and upon the same date she was placed in commission as a light-house tender, and the work of alteration and refitting to better adapt her to the service begun. On January 31, 1900, though performing the duties of a tender during 7 days of the month, this work was virtually completed at a cost of about $6,500. Since then she has, except while undergoing minor repairs and alterations, been actively employed, rendering valuable service in the general work of inspection, construction, repair, and maintenance of the lights, beacons, signals, and other aids and works of the district; in the performance of which duties she steamed about 400 hours, making, say, 3,573 miles, with a consumption of about 273 tons of coal, an average of 1,527.6 pounds for each hour of steaming. She is in excellent condition, well adapted and equipped for the service, her high rate of speed—average 12 knots per hour—and seagoing qualities enabling her to perform her duties quickly in any part of the district under any condition of wind and weather.

Tender for the inspector, Third light-house district.—By the sundry civil appropriation act, approved June 6, 1900, $62,500 was appropriated toward constructing, equipping, and outfitting, complete for service, a new steam tender for buoyage, supply, and inspection in the Third light-house district, New York, and authority was given to contract for this vessel at a cost not to exceed $125,000. Plans and specifications for this vessel are now being made.

Recommendation is made that an appropriation of $62,500 be made to satisfy the contract.

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his district extends from a point on the coast of New Jersey oppo- Shrewsbury Rocks (but does not include the rocks) to and includ- Metomkin Inlet, Virginia. It embraces all aids to navigation on seacoast of New Jersey, Delaware, Maryland, and Virginia, and tidal waters tributary to the sea between the rocks and the inlet.
spector.—Commander Adolph Marix, United States Navy.
Engineer.—Lieut. Col. William A. Jones, Corps of Engineers, ited States Army.
n this district there are—

ht-houses and beacon lights, including 5 post lights	67
ht-vessels in position	5
or unlighted beacons	3
-signals operated by steam, caloric, or oil engines	7
-signals operated by clockwork	7
-lighted buoys in position	2
istling buoys in position	3
buoys in position	6
buoys in position	27
er buoys in position	153
amer *Zizania*, buoy tender, and for supply and inspection	1
phtha launch *Leal*, used for works of construction and repair	1

Some 257 inspections of vessels, stations, and post lights were made during the year, and without exception the stations were found to be in an efficient condition and the keepers generally attentive to their duties. Frequent inspections of the buoys were made.

LIGHT-STATIONS.

455. Seagirt, seacoast of New Jersey.—The exterior of the light-house, including the lantern and the brick walls, was repainted. A sand fence 240 feet in length was erected to protect the grounds from drifting sands. Various repairs were made.

458. Absecon, Atlantic City, seacoast of New Jersey.—The southern part of the lawn was plowed up, the weed roots, etc., removed, about 500 cubic yards of new soil spread upon it, and a reseeding of white clover and June grass made. The seeding survived the winter, and during the present season was kept watered and mowed by the contractor under his guarantee, so that the grounds now present a fine appearance. About 65 ornamental trees and 350 ornamental shrubs and hedge plants were set out. Various repairs were made.

459. Ludlam Beach, seacoast of New Jersey.—A survey of the site was made. A concrete sea wall 156 feet long was built about the rear end of the reservation or lot. Repairs were made.

463. Cape May, seacoast of New Jersey.—The following recommendation made in the Board's last four annual reports is renewed:

This is a first-order seacoast light, and three keepers are employed to attend it. There are quarters for only two families, and the third keeper has to be accommodated by makeshift arrangements which are thoroughly unsatisfactory and detri-

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mental to the discipline and efficiency of the service. It is estimated that an additional keeper's dwelling can be built here at a cost not exceeding $4,000, and it is recommended that an appropriation of that amount be made therefor.

—. *Harbor of Refuge, Delaware Bay, Delaware.*—Congress, in the sundry civil appropriation act approved June 6, 1900, appropriated $30,000 for the erection of a light-house and fog-signal on the new breakwater. Plans for this work are being made.

469. Delaware Breakwater (west end) Beacon, Delaware Bay, Delaware.—A frame boat landing was built on the inside of the breakwater. Various minor repairs were made.

470. Mispillion Creek, Delaware Bay, Delaware.—About 1,000 bushels of oyster shells were placed upon the road across the marsh to the light-house. A splashboard 3 feet high and 320 feet long was placed along the top of the front and right banks, and earth was filled in along its base. Various repairs were made.

471. Brandywine Shoal, Delaware Bay, Delaware.—A coal-oil engine and an air compressor were purchased for use in connection with the proposed fog-signal trumpet. Various repairs were made.

477. Maurice River, Delaware Bay, New Jersey.—The erection of a brick oil house was begun under contract. Various minor repairs were made.

478, 479. Maurice River range lights, Delaware Bay, New Jersey.—A ladder and platform were erected at the rear range. The pressed-lens lanterns in use on the range were replaced with 180-degree-silver-reflector-standard-lens lanterns. A galvanized-iron oil house was built with a concrete floor and concrete-filled iron foundation columns. A contract was made for the erection of a new boat landing, an elevated board walk from the dwelling to the boat landing, and another from the dwelling to the front light, and for the construction of a drainage system. Various repairs were made.

—. *Elbow of Cross Ledge, Delaware Bay, New Jersey.*—Congress having authorized the construction of a national harbor of refuge for vessels near the mouth of Delaware Bay, a stone breakwater about a mile and a half long is being built, which, when completed, will provide a secure anchorage area of over 700 acres. As the harbor of refuge in question is nearly finished, and as it will be of little service at night unless properly lighted, the Board is of the opinion that a gas-lighted beacon should be established on an iron-caisson structure on the Elbow of Cross Ledge in Delaware Bay. It is estimated that this work can be done at a cost not exceeding $60,000. Recommendation is made that an appropriation of this amount be made therefor.

483. Mahon River, Delaware Bay, Delaware.—Plans and specifications were made and one bid received for the building of a light-house, oil house, barn, and wharf. The bid, being in excess of the appropriation, was rejected. The plans will be modified and then bids will again be asked. Various minor repairs were made.

486. Bombay Hook, Delaware River, Delaware.—The grounds about the light-house were graded so as to drain the pool on the front of the reservation and to give the lawn a smooth surface. The disturbed portions were reseeded and the fences were repaired. Various repairs were made.

487. Port Penn range (front), below Port Penn, Delaware River, Delaware.—The kitchen and dining-room addition to the light-house having settled, was raised to its original level and properly blocked up. Various minor repairs were made.

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488. Port Penn range (rear), Delaware River, Delaware.—A double white-oak culvert was put under the road leading over the right of way to the station, and the adjacent roadbed was regraded. Various minor repairs were made.

489. Reedy Island range (front), Delaware River, Delaware.—The boathouse, shop, oil house, and elevated board walks were completed. The boathouse is a frame structure, having a pile and iron-column foundation, an apparatus for hoisting boats, a bin for the storage of coal, a workbench, and a tool cupboard. The oil house is of galvanized iron, having a concrete-filled cast-iron column foundation and a concrete floor.

490. Reedy Island range (rear), Delaware River, Delaware.—Extra downhaul and counterbalance ropes were furnished. Designs were prepared and 20 bands or clamps were placed upon the cracked cast-iron sockets and columns of the tower. Various minor repairs were made.

491. Salem Creek, Delaware River, New Jersey.—A timber-foundation crib was nearly built by contract. Various minor repairs were made.

492. Finns Point range (front), Delaware River, New Jersey.—A stone sea wall 12 feet high and 476 feet long, having a grillage foundation, was built along the lower part of the river front of the reservation. The stones deposited upon the top and rear slope of the river bank, in front of the outer end of the reservation, were removed and piled in its rear. Its foundations having settled, the rear part of the light-house was raised and its supporting piers were built up. A new cistern pump was furnished, the wooden water tank was recalked, and the downspouts, cut-offs, etc., were repaired. Various other repairs were made.

—. *Port Penn range, Reedy Island range, Finns Point range, Delaware River, New Jersey.*—The reestablishment of these ranges is made necessary by the construction of a new channel in the Delaware River, to take the place of the channel now marked by these ranges as now located. The officer of the Engineer Corps of the Army in charge of the improvement of Delaware River states that—

> The contract now about to be entered into for the improvement of Delaware River provides for the formation of a 30-foot channel from a point nearly opposite Appoquinimink Creek, Delaware, to deep water above Reedy Island, a distance of about 20,500 feet. The work is to be completed on or before October 31, 1901, unless Congress fails to appropriate the necessary funds.

It will be necessary to acquire, by purchase or condemnation, land for the new sites for these beacons. This is almost invariably a cause of delay. If the new channel is not to remain for a long time unlighted, immediate measures should be taken for the acquisition of the needed land. No steps can be taken for the purchase of the land until after an appropriation is made available for that purpose. It is estimated that these new ranges can be established for not exceeding $90,000, if action is immediately taken. The Board therefore recommends the appropriation of this amount therefor.

Congress, by the act approved June 6, 1900, authorized the reestablishment of these ranges at a cost not to exceed $90,000, but made no appropriation therefor.

495. New Castle range (front), Delaware River, Delaware.—The gravel walk extending from the dwelling to the beach was repaired.

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About 800 square feet of sodding was laid, and about 96 ornamental trees and shrubs were set out. Various minor repairs were made.

496. New Castle range (rear), Delaware River, Delaware.—About 76 ornamental trees and shrubs were set out. Minor repairs were made.

497. Deep Water Point range (front), Delaware River, New Jersey.—The picket fence around the light-house was completed, and another, about 150 feet long, was built to inclose a yard in the rear of the barn. Various minor repairs were made.

498. Deep Water Point range (rear), Delaware River, New Jersey.—The kitchen addition to the dwelling was completed, a side veranda with a walk extending to the tower was built. Various repairs were made.

501. Cherry Island range (front), Delaware River, Delaware.—A stand was built in the lantern, a pane of red glass was framed and mounted on the railing of the lantern balcony, and an auxiliary sixth-order lamp and lens were installed to illuminate the red sector.

502. Cherry Island range (rear), Delaware River, Delaware.—The addition to the light-house was completed. This is a frame structure, having a stone-wall foundation and a tin roof. The front veranda was remodeled and a rear veranda was built. Various other repairs were made. A topographical survey of the station was made.

503. Grubbs Landing, Delaware River, Delaware.—Plans and specifications were made for the crib of the proposed off-shore beacon. A box for the storage of oil, etc., was built. Various minor repairs were made. At present there is nothing but the adjacent buoy and the red sector in the Cherry Island front light to mark the point at which vessels should take up and leave the Schooner Ledge Range. A lighted beacon opposite the point referred to would be an improvement. It is estimated that this can be established for not exceeding $8,000, and recommendation is therefore made that an appropriation of that amount be made therefor.

505. Schooner Ledge range (rear), Delaware River, Pennsylvania.—A topographical survey and a map of the station was made. The grounds about the tower, dwelling, and barn were filled in, the slopes sodded, and the flat surfaces were reseeded. The drains were altered to correspond to the new ground surface, and the road leading to the front entrance of the reservation was partly graded. Various minor repairs were made.

506. Billingsport (front), Delaware River, New Jersey.—The roadbed and adjacent surfaces were graded, 2,600 feet of sod border was laid, and 8,000 square feet of gravel coating was put in place. About 2,100 bricks were laid in the new walks, and the terra-cotta drain was extended across the road and provided with two brick inlets. Various minor repairs were made.

510, 511, 512. Horseshoe Range (west group) Delaware River, Pennsylvania.—A topographical survey of the site and of the fill recently made by the International Company on the river front was made and a map was platted. Various repairs were made.

524. Fenwick Island, seacoast of Delaware.—The third-order burner was, on July 13, 1899, replaced with a new model fourth-order lamp. The distribution of light from the lamp upon the lens rings is so much better that there is a marked improvement in the light as projected from the lens. Various minor repairs were made.

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526. Assateague, seacoast of Virginia.—The boundary monuments to the northward of the tower were reset to correspond to the boundary lines established in 1896. A brick walk was laid from the west side of the dwelling, down the side of the hill, toward the road leading to the boat landing. About 725 cubic yards of grading was done around the tower and dwelling, and about 108,900 square feet of marsh sod, 8 inches or more thick, was laid around the tower and dwelling to keep the sandy soil from being cut away by the wind. About 280 ornamental shrubs were planted. Some 4,210 feet of board fence was built along the boundaries of the reservation, and some 800 feet of board and wire-net fence was built around the barnyard. A contract was made for furnishing shells with which to extend the road to the oil house. An inch and a quarter driven well 26 feet deep was sunk in the rear of dwelling No. 2. Retaining and wing walls were built for both the front and rear entrances of the barn. Various repairs were made.

REPAIRS.

Repairs more or less extensive were made at the following-named light-stations:

456. Barnegat, N. J.
460. Hereford Inlet, N. J.
463. Cape May, N. J.
465. Cape Henlopen, Del.
466. Delaware Breakwater (east end), Del.
467. Delaware Breakwater (front), Del.
468. Delaware Breakwater (rear), Del.
473. Murderkill Creek (front) Beacon, Del.
474. Murderkill Creek (rear), Beacon, Del.
475. St. Jones Creek (front) Beacon, Del.
476. St. Jones Creek (rear) Beacon, Del.
480. Egg Island, N. J.
481. Cross Ledge, N. J.
484. Ship John Shoal, Del.
489. Reedy Island (front), Del.
493. Finns Point (rear), N. J.
496. Newcastle (rear), Del.
499. Christiana Beacon, Del.
500. Christiana, Del.
504. Schooner Ledge (front), Pa.
507. Tinicum Island (rear), N. J.
508. Fort Mifflin Bar Cut (rear), Delaware River, N. J.
513, 514, 515. Horseshoe Range (east group), N. J.
528. Killick Shoal, Va.

LIGHT-VESSELS.

461. Northeast End light-vessel, No. 44, off the seacost of New Jersey.—This iron light-vessel was built in 1881–82, is of 304 tons gross burden, old measurement, and has a steam fog-signal. She was removed from her station for repairs on August 21, 1899, being relieved by relief light-vessel No. 16 on that date. She was towed to Wilmington, Del., where 2 fog-signal boilers were installed. Her bottom was cleaned and painted; the spar deck was calked; 2 new trysail masts were stepped, new trestletrees for both masts were fitted; deck lights were renewed; new windlass bits were fitted; the engine house was recanvased and painted; new Y connection was made to the stack; the whistle valve was repaired; a new boiler feed pump and new connecting-rod brasses were fitted to the engine; a steam guage was renewed and 6 new guage cocks fitted; 2 water guages were fitted to the boiler, and minor repairs made. The vessel resumed her station on September 28, 1899, when relief light-vessel No. 16 was withdrawn. Fuel, rope, awning, canvas, lumber, paint, oilcloth, crockery, buckets, etc., were furnished.

462. Five Fathom Bank light-vessel, No. 40, off the seacost of New Jersey.—This wooden light-vessel was built in 1875, is of about 350

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tons gross burden, and has a steam fog-signal. She was removed from her station for repairs on July 14, 1899, being relieved by relief light-vessel No. 16 on that date. She was towed to Wilmington, Del., when the work of installing 2 new fog-signal boilers was begun. A hawse pipe was put in on the port side; the decks were calked; the ship was calked outside; the riding and windlass bitts were refastened; the deck lights were renewed; the windlass was overhauled; the bottom was cleaned and the rudder pintles were overhauled; the quarter-boat cranes were raised; the bell was rehung; the deadlights were fitted; a door was fitted to the lantern house; the pumps were overhauled; smoke-box connections and a cape were placed; the after lantern house was recanvased and the metal was repaired; the pipes to the water tanks were renewed; the lever and spring valves were overhauled; a stop valve to the engine was placed; new blow and gauge cocks were supplied to the boiler, and minor repairs were made. She was placed on her station on August 21, 1899. This vessel had leaked at times before coming in for repairs, and during January, 1900, after having returned to her station, she leaked considerably without apparent cause, and as suddenly stopped, before it was ascertained where the leak was. White-pine plugs, pipe wrench, rope, oil, bedclothing, hose, new shore boat, crockery, oilcloth, medicines, paint, etc., were furnished. Coal and wood were supplied.

464. Overfalls light-vessel, No. 46, entrance to Delaware Bay, Delaware.—This steel light-vessel was built in 1887, is of about 337 tons gross burden, and has a steam fog-signal. She has remained on her station throughout the year. Paint, oil, repairs for stoves, awning, rope, buckets, canvas, engineer supplies, etc., were furnished. Coal and wood were supplied.

523. Fenwick Island Shoal light-vessel, No. 52, off the seacoast of Maryland.—This steam, iron light-vessel was built in 1892, is of about 416 tons gross burden, and carries a steam fog-signal. She was removed from her station for repairs on September 28, 1899, being relieved by relief light-vessel No. 16 on that date. She was taken to Wilmington, Del., when her bottom was cleaned and painted; 2 new lantern masts were stepped and the rigging was refitted; 2 trysail masts were stepped; a deck was supplied to the forward and after lamp rooms; lead covering was placed in both lamp rooms; the sills of the deckhouse were renewed; a portion of the berth deck was renewed; the spar deck and forecastle deck were calked and the seams were leaded; a main boom and a new fore gaff were furnished and fitted; the port rail was repaired; 3 chain plates were repaired; the after companionway and the forward and after skylights were recanvased; 2 new backing chains were supplied for rudder; 2 deck plates were fitted; the smoke box of boiler was repaired; a galley pump was fitted; the fore and aft water tanks were connected; a bilge ejector was fitted; pipes were put on the distillers; a diaphragm pump was installed; a sheet-iron smokestack was placed, as was a steam receiver to the fog-whistle; a pipe was fitted to the windlass engine, as was a copper bottom blow from the boilers, a steam pipe to the pump, a coil for the evaporator, a fire-room floor with 3 manhole plates, etc. She returned to her station on November 2, 1899, and light-vessel No. 16 was withdrawn. On March 22, 1900, the characteristic of the fog-signal, a 12-inch steam whistle, was changed to sound blasts of 8 seconds' duration, separated by alternate silent intervals of 32 and 72

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seconds, thus: Blast (8 seconds), silent interval (32 seconds), blast (8 seconds), silent interval (72 seconds). Canvas, paint, rope, oil, heating stoves, crockery, lumber, buckets, oilcloth, engineer supplies, etc., were furnished. Coal and wood were supplied.

525. Winter Quarter Shoal light-vessel, No. 45, off the seacoast of Virginia.—This steel light-vessel was built in 1887, is of about 336 tons gross burden, and has an 8-inch chime fog whistle operated by compressed air; two 3½-horsepower oil engines are utilized to run the air compressor. She was removed from her station for repairs on November 5, 1899, being relieved by relief light-vessel No. 16 on that date, and she was repaired at Wilmington, Del. Her bottom was cleaned and the zinc sheathing was renewed where necessary; a trysail mast was stepped and a boom was fitted; the rigging was reserved; the windlass was repaired; two new riding bitts; 25 feet of fore and aft fender and one up and down fender were renewed; a cooling pipe for the valve box was furnished, and minor repairs were made. She was returned to her station on December 14, 1899, on which date relief light-vessel No. 16 was withdrawn. A foresail, cylinder oil for the engine, stove pipe, crockery, galley utensils, canvas, paint, rope, salsoda, etc., were furnished. Coal and wood and a new shore boat were supplied.

Relief light-vessel No. 16.—This wooden light-vessel was built in 1854, is of about 250 tons burden, and carries a steam fog-signal. She arrived from the Fifth light-house district in tow of the tender *Zizania* on July 3, 1899, and was taken to Wilmington, Del., to have her boiler retubed. On July 14, 1899, after the completion of repairs, she relieved Five Fathom Bank light-vessel, No. 40, remaining on the station while that vessel was undergoing repairs. Subsequently, for similar reasons, she relieved Northeast End light-vessel, No. 44, on August 21, 1899; Fenwick Island Shoal light-vessel, No. 52, on September 28, 1899, and Winter Quarter Shoal light-vessel, No. 45, on November 5, 1899, being manned during each period by crews from the respective vessels. On December 14, 1899, after the last-named vessel had been returned to her station, this light-vessel was towed to Delaware Breakwater and thence to the general light-house depot at Tompkinsville, N. Y., and delivered, on December 22, 1899, to the inspector of the Third light-house district. A galley stove was supplied.

DAY OR UNLIGHTED BEACONS.

No repairs to isolated daymarks were made during the fiscal year.

FOG-SIGNALS OPERATED BY STEAM, HOT AIR, OR OIL ENGINES.

461. Northeast End light-vessel, No. 44, New Jersey.—This 12-inch steam whistle was in operation some 397 hours and consumed about 22 tons of coal. The bell was in use as a fog-signal about 50 hours, the boilers being disabled.

462. Five Fathom Bank light-vessel, No. 40, New Jersey.—This 12-inch steam whistle was in operation some 417 hours and consumed about 21 tons of coal.

464. Overfalls light-vessel, No. 46, entrance to Delaware Bay.—This 12-inch steam whistle was in operation some 457 hours and consumed about 20 tons of coal.

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466. Delaware Breakwater (east end), Delaware.—This second-class Daboll trumpet, operated by an oil engine, was in operation some 471 hours and consumed about 210 gallons of mineral oil.

472. Fourteen Foot Bank, Delaware Bay, Delaware.—This second-class Daboll trumpet, operated by a hot-air engine, was in operation some 370 hours and consumed about 2 tons of coal.

523. Fenwick Island Shoal light-vessel, No. 52, Maryland.—This 12-inch steam whistle was in operation some 236 hours and consumed about 33 tons of coal.

525. Winter Quarter Shoal light-vessel, No. 45, Virginia.—This 8-inch chime whistle, run by a 3½-horsepower oil engine, was in operation some 373 hours and consumed about 337 gallons of mineral oil.

Relief light-vessel No. 16.—This vessel occupied the following-named stations during the year, and the 12-inch steam whistle was in operation as follows: At Five Fathom Bank light-vessel station, New Jersey, from July 14 to August 21, 1899, the signal being in use some 45 hours, consuming about 2 tons of coal; also at the Northeast End, New Jersey, light-vessel station, from August 21 to September 28, 1899, the signal being in use 1½ hours, consuming about one-half ton of coal; also at the Fenwick Island Shoal, Maryland, light-vessel station from September 28 to November 2, 1899, the signal being in use some 43½ hours, consuming about 1¼ tons of coal; and at the Winter Quarter Shoal, Virginia, light-vessel station, from November 5 to December 14, 1899, the signal was not in use and no fog was reported.

BUOYAGE.

There were maintained last year on the seacoast from Squan Inlet, New Jersey, to Chincoteague Island, Virginia, 26 buoys; in Barnegat Inlet, New Jersey, 9 buoys; in Little Egg Harbor Inlet, New Jersey, 7 buoys; in Absecon Inlet, New Jersey, 5 buoys; in Great Egg Harbor Inlet and River, New Jersey, 12 buoys; in Townsend Inlet, New Jersey, 3 buoys; in Hereford Inlet, New Jersey, 5 buoys; in Delaware Bay and River and Schuylkill River, 116 buoys; in Chincoteague Inlet, Virginia, 5 buoys; in Metomkin Inlet, Virginia, 3 buoys; in all, 191 buoys.

GAS-LIGHTED BUOYS.

482. Elbow of Ledge No. 14.—This buoy was in position and continued lighted from July 1 to November 13, 1899, on which date its extinguishment was reported. A new buoy was placed on November 14, and continued in operation until January 6, 1900, when it was extinguished and dragged from its station by heavy ice, being recovered by the tender *Zizania* on January 9, 1900. The station was marked during the ice season by a first-class iron ice buoy similarly painted and numbered until March 11, 1900, on which date the gas buoy was reestablished, continuing in operation during the remainder of the year.

494. Goose Island Flat No. 26.—This buoy continued lighted and in position from July 1, 1899, to January 4, 1900, on which date it was reported damaged and adrift in heavy ice, and on January 8, 1900, was recovered by the tender *Zizania*. The station was marked during the ice season by a first-class iron ice buoy, similarly painted and numbered, until March 14, 1900, when the gas buoy was reestablished.

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It continued lighted and in position until May 17, 1900, on which date the light was extinguished, the report being received on May 18. On May 19, 1900, a new buoy was substituted and continued in operation during the remainder of the year.

Some 7,884 cubic feet of gas were supplied to gas buoys during the year by the Camden, N. J., plant. Repairs were made to a gas buoy.

Cape May boat house, Cape May, New Jersey.—This boat house is used by the Northeast End light-vessel, No. 44, and Five Fathom Bank light-vessel, No. 40, being provided for the care of their boats, sails, oars, etc., when on shore on leave. It is in good condition.

DEPOTS.

Absecon buoy depot, Atlantic City, N. J.—Eight of the broken wharf piles were replaced, the wharf deck was leveled up, and about 26 diagonal braces were put in place by contract.

Edgemoor light-house depot, Delaware River, Delaware.—About 12,000 cubic yards of mud was removed from the harbor by contract, and a contract was made for repairing the storehouse. The following recommendation was made in the Board's last three annual reports:

The keepers of this depot are now obliged to live in Wilmington, about 4 miles distant. It is estimated that a suitable dwelling and necessary outbuildings can be built for not exceeding $5,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

The Board estimates that, as prices are at the present time, it will cost $6,000, and recommendation is therefore made that an appropriation of this amount be made therefor.

Chincoteague buoy depot, Chincoteague Inlet, Virginia.—The sills were repaired and the storehouse was raised and placed on new foundation blocks and repaired. A wall was built, designed so as to extend to the wharf front about 24 feet, and the space behind it was filled in with oyster shells. The road leading from the depot to the street was graded up to the wharf level and covered with oyster shells.

TENDERS.

Zizania.—This steel twin-screw steamer was built in 1887, and is of about 417 tons gross burden. She was employed, except during the 42 days while she was laid up for repairs, in attending to the buoyage of the district, in towing 4 light-vessels to and from their stations when they came in for repairs, and in delivering fuel and supplies to light-vessels and light-stations. She replaced and renewed 18 buoys, changed 173, lifted and painted 50, restored 9, shifted 3, recovered 2, placed 17, and removed 14 buoys. She delivered 154 tons of coal and 8 cords of wood to light-vessels, and 121 tons of coal and 11¼ cords of wood to light-stations. She also delivered provisions to 5 light-vessels and 10 light-stations, and necessary supplies to light-vessels and all light-stations. She conveyed the inspector upon his regular inspection. Two trips were made to the general light-house depot during the year, the first on September 30, 1899, for supplies, arriving at Edgemoor supply and buoy depot on October 6, 1899, and the second on December 22, 1899, with light-vessel No. 16 in tow. Supplies were received and the tender arrived at Edgemoor supply and buoy depot on December 24, 1899. In doing the above work she steamed about 9,928

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miles, consuming about 796 tons of coal and 5 cords of wood. Some 109 hours' work was done at the Edgemoor light-house depot and at the Iron Pier, Lewes, Del. Her bottom was cleaned and painted; 4 plates on keel were renewed; 22 butts were calked; 12 feet of stern rail were renewed; 10 feet of fore-and-aft carling and sheer plank were renewed; 2 doors were put into the pilot house; window sash was rehung in the master's room and the chart room; an anchor davit was placed amidships; an iron stanchion was placed, and 6 feet of iron covering was put on the rail. The steam pipe to the radiator was renewed; a brass check valve was placed and suction valves were added to the feed pump; 4 cast-iron floor plates were placed in the fire room; strainers were added for the suction pipes to bilges; a bottom was put into the combustion chamber of the boiler; back-bearing bars were added for grate bars; new flooring, ceiling, and sheathing were put into 2 coal bunkers; 10 through bolts in soft patches were renewed; and the boiler iron-protection plate in front of boiler was renewed. An electrical plant was installed, the vessel being wired for 80 16-candle-power 100-volt lamps. A 12-inch search light of the pilot-house pattern was furnished. All running lights are now electric. Lubricating and lard oil, coal baskets, paint, brooms, rope, tallow, canvas, soap, mineral oil, grate bars, waste, fire bricks, packing, lumber, incandescent lamps, fire and deck hose, gaskets, gum valves, flags, table and bed linen, engineer supplies, etc., were furnished. A ship's caboose was installed.

Launch Leal.—This naphtha launch, of about 5 tons burden, assisted in general repair work during the year, except between January 9 and May 23, 1900, when she was stored at the Edgemoor light-house depot.

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district extends from, but does not include, Metomkin Inlet, ia, to and including New River Inlet, North Carolina. It ces all aids to navigation on the seacoast of Virginia and North na between the limits named, all of Chesapeake Bay, and the s of North Carolina and tributary waters.

pector.—Commander E. P. Wood, United States Navy, to Decem-, 1899; Capt. Yates Stirling, United States Navy, from Decem-, 1899, to January 15, 1900; since then Commander Albert Ross, d States Navy.

gineer.—Lieut. Col. William A. Jones, Corps of Engineers, United s Army.

this district are—

houses and beacon lights, including 25 post lights	161
vessels in position	3
unlighted beacons	11
gnals operated by steam, caloric, or oil engines	5
gnals operated by clockwork	65
ling buoy in position	1
uoys in position	5
ighted buoys in position	3
buoys in position, including pile buoys and stakes	1,112
mers *Holly*, *Maple*, and *Violet*, buoy tenders, and for supply and inspec-n	3
launch *Bramble*, used to supply gas to the beacons in the sounds of rth Carolina	1
pie (and gas tank) for supplying beacons and coast station	2
mers *Jessamine* and *Thistle*, for construction and repairs	2

LIGHT-STATIONS.

35, 536. Sewell Point Spit beacon and Willoughby Spit beacon, mpton Roads, Virginia.—Two beacon structures were erected guide from Hampton Roads into Willoughby Bay. Each is com-ed of three wooden piles braced together, with a fourth pile in the ter for supporting the lantern. The structures were lighted on uary 1, 1900. Sewell Point Spit beacon stands in 8 feet of water the northerly end of the spit making out northeasterly from Sewells int; it is painted red, and shows a fixed red lantern light 12 feet ove mean high water. Willoughby Spit beacon stands in 10 feet of ter on the shoal making off northwesterly from Willoughby Sand-it; it is painted black, and shows a fixed white lantern light 12 feet ove mean high water.

541. Western Branch beacon, Elizabeth River, Virginia.—In July small crane was placed for hoisting the lantern, and the top of the ructure was decked over to make the central pile rigid.

545. White Shoal, James River, Virginia.—On June 30, 1900, a d sector was put into this light.

557. Jordan Point, James River, Virginia.—On June 30, 1900, a red sector was put into this light.

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571. Tue Marshes, York River, Virginia.—Two iron landing ladders were placed. Various repairs were made.

—. *Ragged Point, Potomac River, Virginia.*—The following recommendation, made in the Board's last four annual reports, is renewed:

This shoal makes off from the west bank of the river at a short turning point. It is important that this point be marked by a light at night and a fog-signal during thick weather. It is estimated that a light and fog-signal station can be established here for $20,000, and it is recommended that an appropriation of this amount be made therefor.

577. Bells Rock, York River, Virginia.—A storage platform was built under the house after the old one had been removed. Various repairs were made.

584. New Point Comfort, entrance to Mobjack Bay, Virginia.—Some 184 feet of rail fence was put up, and about 18 feet of plank walk 3 feet wide and 32 feet of walk 2 feet wide were laid. Various repairs were made.

586. Stingray Point, mouth of Rappahannock River, Virginia.—The dark sector in this light was replaced.

587. Bowlers Rock, Rappahannock River, Virginia.—New model fifth-order lamps were installed. Various repairs were made.

600. Piney Point, Potomac River, Maryland.—New model fifth-order lamps were installed. Various repairs were made.

602. Blakistone Island, Potomac River, Maryland.—Materials have been gotten out at the Lazaretto depot for a wooden fog-bell tower to replace the present structure. The new work will be erected soon.

606. Mathias Point Shoal, Potomac River, Maryland.—New model fifth-order lamps were installed. Various repairs were made.

—. *Point No Point, west side of Chesapeake Bay, between Potomac and Patuxent rivers, Maryland.*—The following recommendation was made in the Board's annual reports for 1891, 1892, and 1893:

There is a stretch of about 30 miles between the Cove Point and Smith Point lights which should be better lighted. For a part of the distance navigators are without a guide, where a deviation from their sailing course might carry vessels of heavy draft onto dangerous shoals. There are many of this class of craft now trading to Baltimore and their number is increasing. A light-house on the shoal off Point No Point would be a useful warning, and a suitable structure can probably be erected there for $35,000. It is recommended that an appropriation of this amount be made therefor.

The following recommendation which was made in the Board's annual report for 1894 is renewed:

In view of recent damages by ice to screw-pile structures in Chesapeake Bay, the Board is now of opinion that only caisson structures should be used where such dangers exist, and that a caisson structure should be erected at this place. It is estimated that it may cost, in view of the possibly soft bottom, not to exceed $70,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

607. Upper Cedar Point, Potomac River, Maryland.—New model fifth-order lamps were installed. Ruby glass was supplied for the red sector. Various repairs were made.

609. Fort Washington, Potomac River, Maryland.—The lantern of the tower is small and its ventilation is poor. This can be remedied only by a larger lantern placed on another tower. The tower should be built about 6 or 8 feet higher than the present one, that the light may show above a structure which has recently been erected at the military post here by the War Department. It is estimated that a

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new tower can be built for about $1,600. The Board therefore recommends that an appropriation of this amount be made therefor.

616. Hooper Island, east side of Chesapeake Bay, Maryland.—The delivery of the caisson, the foundation cylinder, and the ironwork required for the completion of the brickwork of the foundation pier was not completed by the contractor for the metal work until October 21, 1899, although he had contracted to deliver by September 13, 1899. The contractor for erecting the work failing to commence operations, it was decided in May, 1900, to annul the contract and readvertise for proposals for erecting the structure. This was done, and the new bids were opened on June 14. The lowest bid was accepted, and contract is now in course of execution. The remainder of the metal work required for the light-house was delivered at the Lazaretto light-house depot, Baltimore, Md., on December 21, 1899.

618. Drum Point, entrance to Patuxent River, Maryland.—A fuel platform, with connections to landing ladders, was built under the dwelling. Various repairs were made.

621. Choptank River, opposite entrance to Choptank and Tred Avon rivers, Maryland.—New model fifth-order lamps were supplied.

—. *Chester River, Maryland.*—Three sets of range lights are needed on this river near the upper end of Swan Point, as there is a bar in this part of the river, with a narrow channel between it and the mainland, making navigation at night dangerous. It is estimated that these range lights can be established for not exceeding $3,000, and it is therefore recommended that an appropriation of that amount be made therefor.

630, 631. Rockhall Creek beacons, Maryland.—Range beacons Nos. 1 and 2 were carried away by ice in February, 1900.

633. Baltimore light and fog-signal station, Patapsco River, Maryland.—The following recommendation appeared in the Board's last annual report:

> It is now evident that the expense of building a light-station in the 55 feet of semifluid mud which overlays the sandy bottom will be great. It is estimated that it will cost $60,000, in addition to the $60,000 already appropriated, to build this light-station at the site selected. The Board therefore recommends that $60,000 be appropriated in addition to the $60,000 appropriated by the act of August 18, 1894.

The Board now recommends that either this appropriation be made, or that authority be given to contract for the work at a cost not exceeding $120,000.

636. Seven Foot Knoll, mouth of Patapsco River, Maryland.—Two steel boat davits with wooden stretchers, falls, boat chains, etc., complete, and a boat hoister were put up. Two iron rods with swivels were placed under the main gallery to support the davits. The lower edge of the iron dwelling was protected by a band of plate steel. A landing platform was built on the lower iron braces.

639. Fort Carroll, Patapsco River, Maryland.—A kitchen with a porch connecting with the keeper's dwelling and a woodshed were erected. Some 77 running feet of fence with a gate was built. The light tower was moved about 100 feet in a southerly direction in order to make room for certain improvements to the fort. In April it was restored to its former site, and the light was so changed as to show fixed white with a red sector. The latter was introduced to mark the turn from the Brewerton Channel into the Fort McHenry Channel.

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643. Pooles Island, off mouth of Gunpowder River, Maryland.—A porch was erected and 32 square feet of brick pavement with stone curbing laid. A concrete floor was laid in the cellar and steps were built. A wooden walk 117 feet long was laid from the dwelling to the bell tower, and 69 feet of new picket fence was built. Various repairs were made.

651. Bodie Island, seacoast of North Carolina.—There is but one dwelling at this station for the keeper and his two assistants, and it is impossible for them to have their families with them because of the lack of sufficient and proper accommodations. This fact does not tend to make the keepers contented or to induce that degree of interest in the station on their part necessary to maintain it in the best condition. It is estimated that an additional dwelling, with cisterns and the necessary outhouses, can be built for a sum not exceeding $7,500, and it is recommended that an appropriation of this amount be asked therefor.

653. Cape Hatteras Beacon, near the southern extremity of the point of Cape Hatteras, North Carolina.—The light-post was overthrown by the severe storm of August, 1899. It was reerected and the light was reestablished on August 24, 1899.

656. Cape Lookout, seacoast of North Carolina.—The accommodations for the keepers here are inadequate. Only one dwelling is provided for the principal keeper and his two assistants. Their families can not be with them, and at such an isolated and lonely place this is a hardship. Better service would be rendered by the keepers if quarters were furnished for their families. It is estimated that for $7,500 a new building can be erected here, with cistern and outbuildings for the use of the principal keeper and for putting up solid partition in the present dwelling to make separate quarters for the first and second assistant keepers. The Board recommends that an appropriation of this amount be made therefor.

671. North River, entrance to North River, North Carolina.—New model fifth-order lamps were installed. Various repairs were made.

684. Gull Shoal, Pamlico Sound, North Carolina.—The fuel platform was removed because its position endangered the safety of the light-house during very high tides. Various repairs were made.

686. Northwest Point Royal Shoal, Pamlico Sound, North Carolina.—The following recommendation, made in the Board's last annual report, is renewed:

> The sight of this light-house, on the edge of a shoal that is wearing away, is unsafe. The house is so low that during the hurricane of August 17, 18, and 19, 1899, the storm seas dashed over it, doing much damage. The recent efforts made to strengthen this structure were unsuccessful. It oscillates so badly in ordinary weather that it is impracticable to keep the roof from leaking. It is important that a new structure be erected soon. This is one of the most important light-house sites in the sounds of North Carolina. It is estimated that the proposed work can be done for not exceeding $30,000, and the Board therefore recommends that an appropriation of this amount be made therefor.

It was decided, in view of the dangerous condition of the structure, to remove the apparatus and discontinue the lens light, establish an eight-day lantern light instead, and transfer the keeper to the neighboring light-station at Southwest Point Royal Shoal, from which he could attend to the light. In order to increase the efficiency of the light, of which complaint was made, a fifth-order lamp with reservoir to hold eight days' supply of oil was installed in the place of the pos

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lantern, and a fourth-order lens was placed in the light-house lantern. The fog-bell apparatus was removed from the station. On June 1, 1900, the light was changed to fixed red by means of ruby chimneys, so as to distinguish it from Southwest Point Royal Shoal light. The light is not satisfactory and is liable to be destroyed at any time.

690. Pungo River beacon, Pamlico Sound, North Carolina.—To supply the demand for a light to facilitate the navigation of the Pamlico and Pungo rivers, North Carolina, a beacon was erected in November, 1899, near the junction of these rivers, in about 9 feet of water, nearly 7 miles northwesterly from the Pamlico Point light-house. It is formed with four piles, three of them making an equilateral triangle, with the fourth pile driven in the center to support the lantern. The three outer piles are fastened together at the top by timbers, forming a frustum of a pyramid. The new light was, on May 1, 1900, shown for the first time.

700. Neuse River, entrance to Neuse River, North Carolina.—A platform was built under the house for the storage of fuel. Three iron landing ladders were placed, and a trapdoor was fitted in the gallery deck. Two water tanks were set. Various repairs were made.

REPAIRS.

Repairs, more or less extensive, were made at the following-named stations:

529. Hog Island, Va.
532. Cape Henry, Va.
534. Old Point Comfort, Va.
542. Naval Hospital, Va.
543. Newport News Middle Ground, Va.
544. Nansemond River, Va.
549. Deep Water Shoals, Va.
570. York Spit, Va.
585. Wolf Trap, Va.
588. Windmill Point, Va.
590. Tangier Sound, Va.
594. Great Wicomico River, Va.
596. Point Lookout, Md.
603. Cobb Point Bar, Md.
605. Lower Cedar Point, Md.
610. Jones Point, Va.
619. Cove Point, Md.
620. Sharps Island, Md.
622. Bloody Point Bar, Md.
624. Greenbury Point Shoal, Md.
625. Sandy Point, Md.
627. Queenstown Creek Beacon, Md. No. 1.
634. Craighill Channel, front, Md.
635. Craighill Channel, rear, Md.
637. Cutoff Channel, front, Md.
640. Hawkins Point, front, Md.
641. Leading Point, Md.
642. Lazaretto Point, Md.
650. Currituck Beach, N. C.
652. Cape Hatteras, N. C.
655. Ocracoke, N. C.
665. Beacon Light No. 8 (Long Point), N. C.
672. Wade Point, N. C.
676. Edenton Harbor, rear, N. C.
678. Alligator River Beacon, N. C.
679. Croatan, N. C.
680. Blockade Shoal Beacon, N. C.
681. Roanoke Marshes, N. C.
682. Long Shoal, N. C.
685. Southwest Point Royal Shoal, N. C.
687. Harbor Island Bar, N. C.
688. Brant Island Shoal, N. C.
698. Windmill Point Shoal Beacon, N. C.
702. Otter Creek Beacon, N. C.

LIGHT-VESSELS.

530. Cape Charles light-vessel No. 49, entrance to Chesapeake Bay, Virginia—This composite vessel was built in 1890–91, is of about 299 tons gross burden, and has a steam fog-signal. On July 1, 1899, she was placed on her station, after having received a thorough overhauling. During the hurricane of August, 1899, she remained in position without accident, but in a severe gale on October 31, 1899, she strained so hard that the starboard chain stopper broke and carried away all castings and connections. A rope stopper was put on the chain, which

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somewhat relieved the strain on the windlass, but the starboard chain parted, when 90 fathoms of chain and the mushroom anchor were lost. In making sail the jib and foresail were torn and split, and the main boom was broken, but with such sail as could be made she was worked inside of Cape Henry. When off Lynnhaven Bay she took a towboat and was towed to the Portsmouth light-house depot. The riding stopper and sails were repaired, and a new main boom was made, new moorings were furnished, and supplies put on board. On November 12, 1899, she was replaced on her station. She was kept supplied with all necessary stores.

538. Bush Bluff light-vessel, entrance to Norfolk, Elizabeth River, Virginia.—The wooden schooner *Drift*, of about 87 tons gross burden, which is borrowed from the Coast and Geodetic Survey, remained on her station during the year, except when, on February 25, 1900, she was dragged about 100 yards inshore by the ice. On March 7, 1900, that being as soon as the ice would permit, she was put back on her station. She was furnished with all necessary supplies.

—. *Cape Lookout Shoals light-vessel, North Carolina.*—The following recommendation in effect was made in eight preceding annual reports of the Board and is renewed:

Cape Lookout Shoals extend 8 miles beyond the point of the cape. There are dangerous breakers on the shoals 5 miles from the cape. When a vessel drawing more than 15 feet of water has made sufficient offing to just clear these shoals, she is 10 miles distant from the Cape Lookout Light. Although this light is of the first order, shown from a tower 150 feet high, and should be seen a distance of 18 miles under favorable circumstances, it may happen during thick or hazy weather that a mariner may fail to see it in time to avoid that line of shoals. A light-ship of the improved model now constructed for use at exposed stations, and provided with a steam fog-signal, to cost $90.000, approximately, would be a valuable aid to navigation if placed near the southern extremity of the shoals. It is therefore recommended that an appropriation of that amount be made therefor.

654. Diamond Shoal light-vessel No. 69, off the outer shoals off Cape Hatteras, North Carolina.—This self-propelling composite steam-light vessel was built in 1897–98, is of about 407 tons gross burden, carries a steam fog-signal, and uses electric lights. She was stranded on the beach near Cape Hatteras in the hurricane of August 15–18, 1899, was floated, and, on September 23, 1899, was delivered at Baltimore. She was stripped of all movable articles and bids were asked for putting her in proper repair. When the bids were received it was found that cost of the repairs exceeded the amount available for the purpose, and action was deferred until an appropriation was made therefor by Congress. On February 26, 1900, a contract was made for repairing the vessel. The work was commenced at once, and it will be completed early this fall. She was hauled out on the railway, thoroughly cleaned, the ironwork scraped, the woodwork cleaned, and the wooden bulkheads and doors repaired. The metal sheathing was taken off, all damaged planking and the entire wooden sheathing was renewed, and new felt and copper were put on. The false keel from stem to stern, about 70 feet of the main keel, and the lower part of the stern post were renewed. A new rudder and rudderpost were made and fitted, the damaged deadwood aft was renewed where necessary, both rolling keels were refastened and the one on the port side was rebuilt for about one-third of its length. All strainers and sea valves were renewed. the fender strake was repaired where damaged, all its fastenings were overhauled, the upper starboard side where dented was made fair, and the cargo ports were made to fit water-tight.

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The canvas on the spar deck was taken up, the planks that were started were screwed down, and this deck and also the main and lower decks were calked and made tight. The waterways were cemented, the upper rail and netting were repaired, the bell wires were overhauled, the steam whistle was put in place and connected, the belfry and anchor davit were replaced, a new and heavier base was made for the anchor davit, and the steering gear was overhauled. The propeller was taken off, a new blade was made and riveted on, the propeller shaft was taken out and straightened, and the shaft and propeller were put back in place. All sea connections and pumps were put in condition, all steam, exhaust, or water pipes were overhauled, and the engine and condenser were taken apart and all necessary work was done. The entire electric plant was overhauled, the batteries were renewed, the lanterns were repaired, and everything was tested to insure perfect working. The upright boilers were taken out of the vessel and repaired, and the main boiler was moved forward and the furnaces were removed. The old tubes were taken out, a new back tube sheet was fitted, new tubes and three new corrugated furnaces were put in place, and all stays or other parts removed were replaced. A baffle plate and steam separator were put in each donkey boiler, and all auxiliary parts and connections were put in condition for service. The entire vessel was repainted. The sails and awnings were repaired, the standing rigging was set up and rattled down, new running rigging was rove off, and all blocks were repaired or renewed. Considering the strain that this vessel was subjected to in her stranding and pounding on the beach during one of the heaviest hurricanes recorded at Cape Hatteras, she sustained less damage than was expected, and has proven to be in every way fitted for duty at the most exposed stations. She will be put on the station as the relief of light-vessel No. 71 before the end of September.

654. Diamond Shoal light-vessel, No. 71, off the outer shoals off Cape Hatteras, North Carolina.—This is a self-propelling, composite steam light-vessel; was built in 1897–98; is of about 407 tons gross burden; carries a steam fog-signal, and shows an electric light. At the time of the stranding of light-vessel No. 69 this vessel was under repair. When the vessel was hauled out her copper was removed, the planking down to the center of the lower bilge was taken off, and diagonal plate straps, 10 inches wide and 20 pounds to the square foot, were fitted in pairs transversely on frames connecting with the sheer and lower bilge strakes. The oakum was removed from the remaining planking, new planking was put on, all planking was wedged up tightly and calked. The sheathing and copper were then replaced. All sea connections were put in condition, the forward rail on starboard side was repaired, and the lower deck waterways were cemented. The engine, condenser, air pump, circulating pump, feed pump, and bilge pump were opened up, all necessary repairs were made, and some new tubes were put in the condenser. The fastenings of the main boiler were strengthened, some new tubes were put in, the superheating pipe system was removed from the smokestack uptake, and connections were made for feeding directly through the check valves. A hand circulator was fitted to the boiler and some other minor repairs were made. In addition new composition strainers were fitted to all sea valves, a monkey tail was put on the rudder, and the wood sheathing was covered with felt before the metal was replaced. Wrought-

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iron stanchions were put under every second deck beam, the water tanks were cleaned inside, cemented and painted, a breakwater was built forward of the chain stoppers to prevent water entering the hawse pipes from flooding the main deck, the coal scuttles were repaired, a skylight for the gallery was built, ring bolts were repaired, and the spar, main, and lower decks were recalked. A galvanized iron filter box was put in place and connected, and the entire bell-pull system was overhauled and repaired. As soon as repairs were completed the necessary stores and outfit were placed on board, and she was placed on the station off Diamond Shoals on October 7, 1899. In a gale on November 1, 1899, she dragged about 1¾ miles in a west southwesterly direction, and on November 6, 1899, she was returned to her station. During the gale of January 19 and 20, 1900, she dragged about 2 miles to the northeastward, and on January 25 was returned to her station. Again on February 4 she dragged to about the same position, and on the 11th got back on her station. On February 21 she again dragged to the northeastward about 1½ miles, and when the wind changed on February 24, she dragged back until about 1 mile southwest of her station. On February 27 she resumed her position. On March 1, 1900, she dragged about 2½ miles to the northward and eastward, and again on March 13 about the same distance. On March 15 she dragged about 1¾ miles and on the 19th about the same distance, and in each case she returned to her station as soon as the weather permitted. On April 5 she dragged in a southerly direction about 1½ miles, and it was not until the 9th that she was able to return to her station. Again on May 11 she dragged about 3½ miles to the northeastward, but got back in position on May 13. Before another winter the vessel on this station will be furnished with heavier and improved moorings, and it is expected that less difficulty will be experienced in keeping her in position. The vessel has been kept supplied with all essential stores during the year, though some difficulty has been experienced in coaling during the winter months at this exposed station.

—. *Tail of the Horseshoe, entrance to Chesapeake Bay, Virginia.*—A light-vessel at this point was authorized by the act approved February 18, 1899. It is proposed to place light-vessel No. 71 on this station at an early day, and to keep her there until a more suitable vessel can be provided for this station.

[1] *Relief light-vessel for the Fourth and Fifth light-house districts.*—By the act approved July 1, 1898, an appropriation of $95,000 was made for constructing, equipping, and outfitting complete for service a first-class steam light-vessel with steam fog-signal. She is being built at Weymouth, Mass., and will be ready for launching early in September.

FOG SIGNALS OPERATED BY STEAM, CALORIC, OR OIL ENGINES.

530. Cape Charles light-vessel No. 49, entrance to Chesapeake Bay, Virginia.—This 12-inch steam whistle was in operation some 190 hours and consumed about 27 tons of coal.

532. Cape Henry, south side of entrance to Chesapeake Bay, Virginia.—This first-class steam siren was in operation some 248 hours and consumed about 23 tons of coal.

[1] NOTE.—On October 1 this vessel was about 85 per cent completed, and will be ready for duty before the setting in of winter.

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585. Wolf Trap, west side of Chesapeake Bay, Virginia.—This second-class Daboll trumpet, operated by a petroleum engine, was in operation some 272 hours and consumed about 192 gallons of mineral oil.

595. Smith Point, entrance to Potomac River, Virginia.—This second-class Daboll trumpet was established February 10, 1900, and since then was in operation some 63 hours and consumed about 62 gallons of mineral oil.

654. Diamond Shoal light-vessels, Nos. 69 and 71, off the outer shoals off Cape Hatteras, North Carolina.—This 12-inch steam whistle was in operation some 89 hours and consumed about 4 tons of coal.

DAY OR UNLIGHTED BEACONS.

Leading Point, Maryland.—In August, 1899, the anchor of one of the guys attached to the mast was reinforced by an additional piece of timber.

Western Branch, Elizabeth River, Virginia.—To mark the dredged channels in the entrance to the Western Branch, Elizabeth River, two three-pile structures were erected in October, as follows: Beacon No. 1, painted black, in 10 feet of water, on the southeasterly side of the cut entrance to the Western Branch; Beacon No. 2, painted red, in 13 feet of water, on the northerly side of the dredged channel. Beacon No. 1 was in June, 1900, carried away by a railroad barge.

POST AND BEACON LIGHTS.

James River, Virginia.—Congress having authorized the lighting of this river, an examination of the needs of navigation was made, and a plan was made for the establishment of 18 lights. In October the structures were erected by the crew of the tender *Violet*, and on December 1, 1899, the lights were exhibited. On December 31, 1899, a heavy freshet, with running ice, carried away the iron spindle supporting the light at Meadowville, and a heavier spindle was put up in its place as soon as the ice permitted. On the night of March 31, 1900, it was relighted.

The following-named lights were established:

546, 547. Burwells Bay range.—Two fixed white lights on the bluff at Burwells Bay.

550. Homewood.—A fixed white light on the end of Hog Island Wharf, to guide through Hog Island Swash.

551, 552. Goose Hill range.—Two fixed white lights on the shore at Dollers Wharf, to guide through Goose Hill Channel.

553, 554. Sunken Marsh range.—Two fixed white lights on the shore, to guide past Swan Point Flats.

555, 556. Harrison Bar range.—Two fixed white lights on the shore, to guide across Harrison Bar.

558. Wood Wharf.—A fixed white light, to mark the remains of an old wharf on the edge of the channel.

559. Picketts Wharf.—A fixed white light, to mark the turn in Turkey Island Bend.

560, 561. Jones Neck Lower and Jones Neck Upper.—Fixed white lights, to mark the end of the jetties.

562. Meadowville.—A fixed white light on an iron spindle set in

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Woodson Rock, a submerged ledge running crosswise of the river below Dutch Gap.

565. Falling Creek, Warwick Bar, Goodes Rock Lower, and Goodes Rock Upper.—Fixed white lights, to mark the end of the jetties below Richmond.

The double burners furnished to the post lights are being changed as fast as practicable to single burners using a flat wick. The post and beacon lights will be furnished soon with portable boxes for the storage of oil, wicks, and cleaning material.

535, 536. Willoughby Bay beacon lights, Virginia.—On January 1, 1900, two beacon lights were established at its entrance, one on the end of Sewell Point Spit and the other on the shoal off Willoughby Sand Spit.

648. Old Field Point post light, Elk River, Maryland.—A fixed white light was established December 1, 1899, on the edge of the shoal off this point, on a pile structure. On January 14, 1900, the structure was demolished by running ice, and in May, 1900, it was rebuilt and the light was reestablished.

690. Pungo River beacon light, North Carolina.—In April, 1900, a four-pile structure was built on the shoal off Wades Point, Pamlico River, and on May 1, 1900, a fixed white light was exhibited. This light not only marks the shoal, but furnishes a guide up and down Pamlico River and into Pungo River.

BUOYAGE.

The hurricane of August, 1899, displaced many of the important buoys in the North Carolina sounds and on the coast to the northern limit of the light-house district. They were all replaced as fast as practicable by the light-house tenders. The gas buoy marking the wreck of the barge *Caravan* at the entrance to Chesapeake Bay, Virginia, was carried away and a spar buoy was put down in its place. The gas buoy soon after was picked up off the beach below Cape Henry. Running ice throughout the winter displaced many of the buoys in Chesapeake Bay and tributaries, and as soon as they were reported they were replaced, if practicable. Most of these buoys were recovered, but the loss of sinkers and moorings was quite large. The stakes in Core Sound, North Carolina, were kept by contract.

DEPOTS.

Lazaretto Point, Baltimore, Md.—The grounds, wharf, and warehouse were cleared of rubbish and tidied up. In September the crane was cleaned and painted. The plank walks were repaired and the windows of the carpenter's shop reglazed.

The following recommendation, made in the Board's last ten annual reports, is renewed:

Attention is invited to the necessity of providing a dwelling at this depot for the accommodation of the depot keeper and his family. Their quarters in the warehouse are unsuitable and uncomfortable, and, even were the rooms not required for other purposes, it would cost nearly as much to make them comfortably habitable as it would to build a new dwelling. About one-third of the space on the upper floor is reserved for the use of custom-house inspectors, and the large and increasing amount of work on hand in the district demands the use of all storage and shop room available. The depot keeper must be constantly on the spot, and can not live away

from the premises. There is ample room on the Government tract for such a building as is required, and it can be built for $2,500. An appropriation of this amount is earnestly recommended.

Portsmouth, Va.—The brick pavement in the coal shed was renewed; repairs of sheet piling and decking of wharf were made, and a double wheelway was built on trestles for moving coal from the wharf into the coal shed. An opening was cut in the end of the coal shed, the position of 38 rafter braces was changed, and new girders, uprights, and braces were inserted. The rebuilding and enlarging of the storehouse for oil was commenced, and a porch was built for the keeper's dwelling. The spaces in the rear of the wharf behind the sheet piling were filled in with oyster shells, and a floor of 3-inch planks was laid in and around the buoy shed to facilitate the moving of buoys to and from the tramway. About 120 feet of iron rails of the tramway were taken up, new stretchers were put down, the rails were relaid, and the decayed boards between the tracks for a space of 4 feet by 264 feet were renewed. The improvements at the depot are progressing, and when completed will greatly increase the facilities for handling and storing supplies.

Point Lookout, Maryland.—A force pump was set up with suction pipe connection to the water tank; 500 feet of discharge pipe was laid and a new inflow pipe was provided. Repairs were made to the wharf.

Washington, N. C.—The cistern was cleaned and thoroughly repaired.

Light-house Wharf, Washington, D. C.—The old wharf at O and Water streets, Washington, D. C., belonging to the Government, was temporarily repaired for use by the Light-House Establishment. An examination of this wharf showed that it was in such bad condition that only minor repairs were then advisable, and they were made, so that temporarily the wharf is in usable condition. To make it suitable for the reception and temporary storage of material, such as buoys, etc., its complete rebuilding will be required, as the sills, joists, and piles show much decay.

It is estimated that this wharf can be put in proper condition for a sum not exceeding $60,000, and the Board recommends that an appropriation of this amount be made therefor.

TENDERS.

Maple.—This steel twin-screw steamer was built in 1892 and is of about 392 tons gross burden. She was hauled out, her bottom was cleaned and painted with antifouling paint, the saloon and staterooms were renovated and painted, the engines were overhauled, the boiler was patched and calked, and the vessel was painted inside and outside. The saloon was partly refurnished and refitted, some furniture was repaired, and the outfit was replenished. She was employed in supplying and inspecting light-houses and light-vessels and in working buoys. She made 8 trips to Diamond Shoals, several in the winter season, and kept the light-vessel there supplied with coal and stores. She worked all the buoys in the district on the coasts and inlets below Cape Hatteras. During the year she steamed some 12,929 miles, on a consumption of about 1,312 tons of bituminous coal. She was employed 12 days on inspection duty, 110 days in working buoys and attending to light-vessels, 37 days in delivering fuel, rations, and supplies to light stations, 66 days at light-house depots coaling, load-

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ing supplies and buoys, and in doing other necessary work, and was 30 days under repair. She worked 460 buoys, visited 160 light stations and vessels, delivered 385 tons of coal and 92 cords of wood to stations and vessels, supplied 31 light-stations with rations, inspected 61 light-stations, and the crew was employed 20½ days at light-house depots cleaning and painting buoys.

Violet.—This wooden side-wheel steamer was built in 1861, and is of about 231 tons gross burden. She was employed in inspection, supply, and buoy work. She supplied all the light stations in the sounds of North Carolina and tributary rivers with annual supplies, rations, fuel, and oil, and worked all the buoys in those waters. In October, 1899, she was employed in locating and building the structures for the post lights on James River, Virginia, and in November she delivered the lanterns and outfits for these lights. She was furnished with a 21-foot Alco-vapor launch for service in the shallow waters of the light-house district, and especially in the North Carolina sounds. During the year she steamed about 12,774 miles on a consumption of some 655 tons of bituminous coal. She was employed 26 days on inspection duty, 42 days in working buoys and attending to light-vessels, 59 days in delivering fuel, rations, and supplies to light stations, 45 days at depots coaling, loading supplies and buoys, and doing other necessary work, and was 19 days under repair. She worked 335 buoys, visited 254 light-stations, delivered 174 tons of coal and 113 cords of wood to stations and vessels, supplied 19 stations with rations, inspected 123 lights, delivered 2,000 cases of mineral oil, hoisted out 200 buoy logs onto the wharf at Portsmouth light-house depot, built 16 post lights on James River, and the crew was employed 10 days at buoy depots cleaning and painting buoys.

Holly.—This iron side-wheel steamer, sheathed with wood, was built in 1881, rebuilt in 1898, and is of about 367 tons gross burden. In August, 1899, she was in the North Carolina sounds and remained there rendering assistance until light-vessel No. 69 was floated, and on her return to Baltimore the crew was employed in stripping light-vessel No. 69 and fitting out No. 71 for service. On October 7, 1899, she was docked, her bottom was cleaned, the old zinc was removed and new zinc was put on, an additional strake of copper was put on forward of the paddle boxes, the copper was refastened where necessary, one set of boat davits was moved, a gangway and ladder were made, the donkey tail of rudder was refastened, the steering gear was overhauled, and new brass bushings were furnished. The condenser tubes were repacked and a number of new tubes put in; the legs of the boiler were calked, and the ventilators were lengthened and new cowls were put on to work from the fireroom. In October, 1899, her crew assisted in building the post light at Old Field Point, Elk River, Maryland. In February, 1900, the old hoisting engine having deteriorated beyond repair, it was taken out and a new one was put in place and the forward bulkhead moved aft enough to make room for it. In May, 1900, her afterdeck and gangways were calked and some leaks around the paddle boxes were stopped. In June, while working buoys in Patuxent River, Maryland, one of the bearings of the walking beam was cracked. During the year she steamed some 12,602 miles on a consumption of about 905 tons of bituminous coal. She was employed 78 days on inspection duty, 135 days in working buoys and attending to light-vessels, 71 days in delivering fuel, rations, and supplies to

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stations, 65 days at light-house depots coaling, loading supplies and buoys, and doing other necessary work, and she was 16 days under repair. She worked 405 buoys, visited 264 light-stations, delivered 81 tons of coal to light-stations, furnished 10 stations with rations, inspected 80 stations, and the crew was employed 30 days at the buoy depots.

Bramble.—This twin-screw launch was built in 1879, and is of about 32 tons gross burden. She attended to the gas beacons in the sounds of North Carolina, and in so doing was under steam 934 hours and steamed about 1,436 miles on a consumption of some 39 tons of bituminous coal. During the year 70,660 cubic feet of gas was made at the gas plant at Long Point and transported to the different beacon lights by the *Bramble.*

The *Bramble* being so much deteriorated as to be beyond repair, Congress by sundry civil appropriation act dated June 6, 1900, appropriated $20,000 with which to build a vessel to replace her. Plans and specifications for that purpose are now in hand.

Jessamine.—This iron side-wheel steamer was built in 1881, and is of about 257 tons gross burden. She inspected 49 light-stations; installed the new model lamps at Choptank River, Piney Point, Upper Cedar Point, Bowlers Rock, Mathias Point Shoal, and North River light-houses; set up the new lens at Stingray Point light-station; changed the illuminating apparatus at Northwest Point Royal Shoal light-station, and removed the fog-bell, machinery, etc., from that station on the discontinuance of the fog-signal. She assisted in making repairs and improvements at 17 light-stations; in the repair of the light-house wharf at Washington, D. C.; in the erection of new beacon lights at Sewell Point and Willoughby Spit, and in the establishment of a second-class Daboll fog-signal at Smith Point. Hull plates were renewed, wheels were altered, the rudder was repaired, and the vessel was painted. New stearing gear was installed, the air compressor and derrick mast were set up, the boiler was cleaned, and minor repairs were made to the hull and machinery. The steering gear was altered and the boiler and machinery, gallows frame, and wheel buckets were repaired. An electric-light plant was installed and the damages caused by collision with a coal barge were repaired. During the year she steamed about 6,217 miles and consumed some 564 tons of coal.

Thistle.—This wooden screw steam tender was built in 1890 and is of about 32 tons gross burden. She was engaged in towing barges carrying material and working parties and otherwise assisting in repairs and improvements at 41 light-stations and at Portsmouth, Va., light-house depot. She steamed some 1,688 miles in towing the working plant consisting of a large scow, small scow, piledriver scow, and large working boat; and steamed alone 4,538 miles, making a total of 6,226 miles run, with a consumption of some 215 tons of coal. She was under steam about 4,104 hours during 297 days, and her machinery was in motion 1,310 hours during 263 days. She was laid up about 30 days for repairs to hull, boiler, and engine and for placing in position a new propeller wheel.

WORKING PLANT.

Large scow.—The galley was transferred from below to the deck. The vessel was docked, the bottom scraped, and 10 sheets of new

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copper were put on. Insect screens were made for the workmen's bunks. In August 8 canvass hatch covers were made.

Small scow.—Three bottom planks were replaced, the joints recalked, and the bottom scraped.

Piledriver scow.—This vessel was hauled out, the old copper sheathing on the sides was patched where broken, and 5 sheets of copper were put on one end. The fenders on the sides and ends were scraped and a fender 27 feet long was fastened to one side.

Working boat.—This was painted inside and outside.

Large flatboat.—Six new timbers and 2 ribbons were put on the sides, the boat was scraped and calked, and 2 coats of paint were applied, inside and outside.

Small flatboat.—One coat of paint was put on inside and outside.

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district extends from, but does not include, New River Inlet, Carolina, to and including Jupiter Inlet light-station, Florida. races all aids to navigation on the seacoasts, bays, sounds, harivers, and other tidal waters of North Carolina, South Carolina, a, and Florida between the limits named.

ector.—Commander John A. Rodgers, United States Navy.

ineer.—Maj. E. H. Ruffner, Corps of Engineers, United States to January 1, 1900; since then Capt. J. C. Sanford, Corps of eers, United States Army.

his district there are—

houses and beacon lights, including 109 post lights	194
vessels in position	3
vessel for relief	1
unlighted beacons	40
gnals operated by steam	2
gnals operated by clockwork	3
ing buoys in position	7
oys in position	11
buoys in position	296
er *Wistaria*, buoy tender, and for inspection and supply	1
ner *Pharos*, for construction and repair	1
ha launch *Water Lily*, for inspection and supply	1
ha launch *Snowdrop*, for construction and repair	1

LIGHT-STATIONS.

—. *Cape Fear, seacoast of North Carolina.*—The site selected was tained by process of condemnation. The assessed award of $4,000 l be paid into court, when the decree of condemnation will go into ect, and preparations for the establishment of the station will be mmenced.

By the sundry civil appropriation act approved July 1, 1898, an ppropriation of $35,000 was made for establishing a first-order lightation at or near the pitch of Cape Fear, North Carolina, and authory was given by the same act to contract for a station in a sum not exceed $70,000. It is estimated that $35,000 will be needed to satfy the contracts to be made under the authority given in the abovenamed appropriation, and it is recommended that an appropriation of $35,000 be made therefor.

710, 711. Bald Head range, North Carolina.—A shoal having worked down across the New Channel post-light range at the entrance to Cape Fear River, an additional range was put in between it and the Smith Island range. It consists of two pyramidal skeleton white wooden beacons, with red post lanterns. They were erected and lighted on June 30, 1900.

—. *Range lights for dredged channels in the Cape Fear River, North Carolina.*—The following recommendation, made in the Board's last eight annual reports, is renewed:

The Board recommended the discontinuance of 10 of the present post lights in the upper part of the Cape Fear River and the establishment of 24 new post lights,

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which, in connection with certain other ranges already established, would constitute a system of ranges to guide vessels from the Cape Fear entrance to Wilmington, N. C., through channels dredged to a depth of 20 feet at mean low water. As vessels are now carried by ranges one-half the distance between the entrance and Wilmington, and then left without further adequate guidance, the Board is of opinion that to complete the usefulness of the aids to navigation in the lower part of the river similar aids should be provided to guide them to their port of destination. It is estimated that this can be done at a cost not to exceed $3,105, and it is recommended that an appropriation of that amount be made for this purpose.

These channels have already been dredged to the depth of 18 feet.

740. Bull Bay, South Carolina.—The site of this station having been purchased, the plans for the iron beacon and dwelling were prepared and bids were asked for furnishing the beacon and the material for the dwelling and outbuildings. Material for the wharf and wooden tramway, boathouse, and storehouse was sent to the station, and they were built by the end of February, 1900. The iron beacon was delivered in Charleston, S. C., in June, and was immediately transported to the station, where in the meantime work had been prosecuted on the other structures. The station is to be ready for lighting early in August, 1900.

744. St. Philips Church, rear beacon of the main channel range, South Carolina.—The electric apparatus for lighting the gas burner was renewed.

745, 746. Mount Pleasant range, South Carolina.—A locomotive-headlight lantern was substituted on the rear beacon for its lens lantern, and the lens lantern of the front beacon was changed from fixed white to fixed red. In May, 1900, an old building, situated in Mount Pleasant and belonging to the Light-House Establishment, was repaired for the use of the keeper of the Mount Pleasant and Hog Island Channel lights.

752–754. Hog Island Channel beacons Nos. 1, 2, and 3, South Carolina.—The beacon No. 4, east side of the channel, was discontinued, and its light was moved to the new structure called Hog Island Channel No. 2. The light of Hog Island Channel beacon No. 1 was moved to a new structure, called by the same name. Beacon No. 2 received a severe blow from a ferryboat under full steam which makes it lean to one side, but it is still strong and substantial.

761–763. Wadmelaw River beacons, South Carolina.—In June, 1899, Enterprise beacon No. 2 was destroyed by drifting rafts. In December, 1899, a new beacon was built.

766, 767. Hilton Head, South Carolina.—The storm of 1898 cut away the beach in front of the dwelling of the keeper of the front beacon of this range so far as to make it certain that the next storm would carry it away, together with the outbuildings. The beacon had already been moved to the rear and was in a comparatively safe position. There being no healthy site nearer than a point near the rear beacon, 1¼ miles distant, the structures of the front beacon, excepting the beacon itself, were moved to that point. In connection with the work a road three-fourths of a mile long was cut, ditched, and graded. The station is in good condition.

768, 769. Paris Island, South Carolina.—The site of the front beacon of this range is being rapidly washed away, and in a short time it will probably be necessary to move it to the rear. Minor repairs were made.

773, 774. Bloody Point, South Carolina.—The conditions at the front beacon were similar to those at Hilton Head range. A contract

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was made to remove the structures at the front beacon to the site of the rear beacon, about 1 mile distant, and to transfer the abandoned Venus Point iron front range beacon to this station. The removal was completed in December, 1899. There was no interruption of the light of the front beacon. The new site was thoroughly drained and a ditch dug about 7,000 feet long to connect with a natural outlet.

775, 776. Tybee, Georgia.—The North Breaker shoal at Tybee entrance having made to the southward, the front beacon was moved 112 feet in that direction to adapt it to the best water on the bar. Heavy brick foundation piers were built, and in September, 1899, the beacon was secured to them. A fixed red reflector light was substituted for its fixed white lens lantern. Various repairs were made.

777, 778. Jones Island range, South Carolina.—Brass long-lived locomotive headlight lanterns were put up in the places of the old ones.

780, 781. Oyster Beds range, Georgia.—A locomotive headlight lantern was substituted for the lens lantern at the front beacon, and at the rear beacon a headlight reflector was put in the lantern, thus strengthening the range light and also retaining the original whole horizon light. The quarters for the keeper and for the keeper of Cockspur beacon are in casemates of Fort Pulaski fitted up for the purpose. They are damp and unsatisfactory.

786. Venus Point, South Carolina.—The abandoned front beacon of the former range was removed, and has become the front beacon of the Bloody Point range, South Carolina.

801. St. Catherines Sound, Georgia.—At the date of the last annual report the United States attorney for the southern district of Georgia had reported that in his opinion it was necessary that condemnation proceedings be commenced anew, and on July 8, 1899, he was requested to begin a new suit. Under the former proceedings in condemnation the appraisers appointed by the court filed their report on January 26, 1899, assessing the damages for the land desired at $100,000, after taking testimony which covered some 150 pages of typewriting, although this property has been returned for a number of years up to date at $38,000 for the whole island, including 13,000 acres of land, and the returns had been sworn in as the true value of the whole island. At the date of this report the matter is still pending.

802. Sapelo, Ga.—The sea is rapidly encroaching on the site, and spring tides sometimes reach the piazza of the keeper's dwelling and the base of the light tower. It will become necessary soon to move these structures. The Board therefore deems it necessary to purchase a new site and to erect a combined light tower and keeper's dwelling in place of the buildings which it is evident will not last much longer. It is estimated that a new site can be purchased and that new buildings can be erected at a cost not exceeding $40,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

809–810. Colonels Island range, Georgia.—A lens lantern was substituted for the post lantern of the front beacon.

—. *The inside passage from Savannah, Ga., to Fernandina, Fla.*—In its last eleven annual reports the Board recommended that it be empowered to erect and maintain 25 post lights in order to facilitate the navigation of the inland passage from Savannah to Fernandina, at an estimated cost of $4,000. An appropriation of this amount has been recommended. This recommendation is renewed.

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811. Little Cumberland Island, Georgia.—A new boathouse was built on posts sunk deep in the ground above high-water mark and fitted with windlass and rollers by which to haul the boat to its place. The dwelling was repaired and a temporary wooden lantern deck put up in the place of the old iron deck, which had rusted so much as to be insecure. A new iron one was provided, but has not yet been put in place.

818–819. Pilot Town range beacons, Florida.—A boathouse was built for the keeper of this and the three next succeeding beacons, connected with the land by an elevated plank walk 100 feet long.

—. *Reimbursement of light-keepers for personal losses sustained during the cyclones of August 27 and 28, 1893.*—The following statement, made in the Board's last six annual reports, is repeated:

A number of keepers of light-houses, the officers and crew of a light-vessel, and the keeper of a buoy depot sustained more or less heavy personal losses when the stations where they were employed were wrecked. Many of them displayed much devotion to the service and incurred great personal danger.

The Board therefore brought these matters to the attention of the honorable Secretary of the Treasury, and he, in letters of November 9 and 16, 1893, and January 29, 1894, to the Speaker of the House of Representatives, transmitted the sworn statements of each keeper as to his losses, indorsed by Commander M. R. S. Mackenzie, United States Navy, inspector of the Sixth light-house district, and recommended that provision be made by Congress for the reimbursement of the loss sustained by these keepers. The losses, as shown in these statements, amount to $2,399.13. Recommendation is made that an appropriation of that amount be made for the reimbursement of losses sustained by the light-house employees in the Sixth light-house district.

Similar losses were sustained by light-keepers in the Eighth light-house district during the hurricane of October 1, 1893. Statements of the losses they sustained, duly approved and indorsed by the light-house inspector, were sent to the Speaker of the House of Representatives by the Treasury Department in its letters of January 29, March 7, and April 3, 1894, with recommendation that reimbursement be made. The sum of these losses, as stated, amounts to $2,603.62. Recommendation is made that an appropriation of this amount be made for the reimbursement of the losses sustained by light-house employees in the Eighth light-house district.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

707. Cape Fear, N. C.
747–748. South Channel range, S. C.
749. Fort Ripley Shoal, S. C.
782–783. Tybee Knoll Cut range, Ga.
788–789. Elba Island range, Ga.
803–804. St. Simon, Ga.
817. St. Johns River, Fla.
906. St. Augustine, Fla.
909. Jupiter Inlet, Fla.

LIGHT-VESSELS.

706. Frying Pan Shoals light-vessel, No. 1, seacoast of North Carolina.—This wooden light-vessel was built in 1885, is about 275 tons gross burden, and has a steam fog-signal. On August 18, 1899, a cyclone passed over this vessel, causing her to drag her 5,000-pound mushroom anchor. After the gale the vessel returned to her station under sail. No damage was done except to start the outward bolts in her hawse pipe. Temporary repairs were made. On June 26, 1900, she was taken into Southport, N. C., for minor repairs. She was temporarily replaced by relief light-vessel No. 29. She was replaced on her station on June 29, 1900, and relief light-vessel No. 29 was removed.

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Two new side awnings and one brass steam gauge were supplied, and some slight minor repairs were made to her machinery.

742. Charleston light-vessel, No. 34, off Charleston Harbor, South Carolina.—This wooden light-vessel was built in 1864, is of about 150 tons gross burden, and has a bell for a fog-signal. On December 10, 1899, she was brought to Charleston for repairs, and relief light-vessel No. 29 was placed temporarily on her station. On February 24 she was hauled out for examination of her bottom. She was cleaned and scraped and all bad spots of metal were patched. The vessel was hauled again on May 18, 1900, and the following-named repairs were made: Foremast, rudder, rolling chock port side were supplied, part of the stem was renewed, a new cutwater was furnished, the hull was stripped, calked, and remetaled, a sternpost was supplied, and part of the deadwood knees and braces inside were renewed. Portions of quickwork planking were renewed, new planking and five timbers on starboard bow, new bulwarks, and 14 timbers forward and aft were supplied. A railport and starboard bow were furnished and all hatches and coamings were renewed, port riding bit and naval pieces, storeroom and water-closet were repaired, gratings forward and aft, hawse pipe and lead sleeve starboard side were supplied, and various minor repairs made. Forward and aft awnings, wind sails, and pin and key for the anchor shackle were supplied, the galley stove was repaired, and the mattresses were remade. She was returned to her station on May 19, 1900, and relief light-vessel No. 29 was brought to Charleston.

765. Martins Industry light-vessel, No. 53, off the seacoast of South Carolina.—This steam light-vessel was built in 1892 and is of about 310 tons gross burden. On July 15, 1899, she was taken to Charleston, S. C., for repairs, and relief light-vessel No. 29 was placed temporarily on her station. She was hauled out, her bottom was cleaned and painted, two masts and rigging were supplied, the forward lantern house and deck were repaired, her sides were painted, and the boilers were scaled. The strainer and two bearer bars were repaired, minor repairs were made to her hull, four ash buckets and her floor plates were renewed, 152 tubes in her donkey boiler were supplied, and minor repairs were made to her machinery. She was returned to her station on August 3, 1899, and relief light-vessel No. 29 was taken to Charleston. On May 20, 1900, she was again taken to Charleston for repairs, and relief light-vessel No. 29 was placed temporarily on her station. She was hauled up, her bottom was scraped, cleaned, and painted, the main deck house was repaired and the top calked, the main and monkey rails on both her bows were renewed, the forecastle decks were patched, calked, and releaded, the water tanks, bulkheads, and bilges were scaled, cleaned, and painted, from the water line to the rail was cleaned and painted, the reflectors were replated, the lead scupper renewed, and tubes were renewed in the main boilers. She was returned to her station June 21, 1900, an relief light-vessel No. 29 was taken to Charleston.

Relief light-vessel No. 29.—This wooden light-vessel of about 232 tons gross burden was built in 1864, and has a bell for a fog-signal. She is kept at Charleston for a relief vessel. On July 15, 1899, she relieved light-vessel No. 53 at Martins Industry, South Carolina, and was returned to Charleston on August 3, 1899. On December 10, 1899, she relieved light-vessel No. 34 at Charleston, and was returned to

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her station at Charleston on May 19, 1900. On May 20, 1900, she relieved light-vessel No. 53 at Martins Industry, South Carolina, and was returned to Charleston on June 21, 1900. On June 26, 1900, she relieved light-vessel No. 1 at Frying Pan Shoals, North Carolina, and was returned to Charleston on June 29, 1900. On December 2, 1899, she was hauled up, her metal work was patched, the decks were patched, caulked, and releaded, the forward gallows frame and lantern house were repaired, part of the rail and bulwarks were renewed, a cutwater, a block for the windlass, and two cleats were supplied, a sternpost and the rudder were repaired, a door for the water-closet, the ballast floor, the floor under the tanks, and the floor in the coal bunkers were renewed, the water tanks were cleaned, scaled, and cemented, the boat was repaired, three new water tanks were put in, the flagstaff forging was renewed, minor repairs to the galley stove were made, a strap was put around the dead eye, and six bolts for the cleats were supplied, the rudder pintles were bushed, straps and various minor repairs were made.

DAY OR UNLIGHTED BEACONS.

There are in this district 40 day or unlighted beacons, and all are in good condition.

FOG-SIGNALS OPERATED BY STEAM.

706. Frying Pan Shoals light-vessel, No. 1, seacoast of North Carolina.—This 12-inch steam whistle was in operation about sixty-five hours, and consumed some 3½ tons of coal and one-half cord of wood.

765. Martins Industry light-vessel, No. 53, seacoast of South Carolina.—This 12-inch steam whistle was in operation some one hundred and fifty-nine hours, and consumed about 11¼ tons of coal and three-fourths cord of wood.

BUOYAGE.

The buoyage of the district is in good condition. All the buoys, except four at the entrance to Charleston Harbor, and four at Stone Inlet, South Carolina, have been relieved once, and in many instances twice, during the year. The Charleston whistling buoy was reestablished. The spar buoys at the entrance to Charleston Harbor were changed to can and nun buoys. Changes were also made at the following-named places: Entrance to St. Simons Sound, Georgia; entrance to Savannah River, Georgia; Doboy Sound, Georgia; entrance to Georgetown and Winyah Bay, South Carolina, and entrance to Cape Fear, North Carolina. Eight buoys were discontinued, 4 buoys were established, the positions of 4 buoys were verified, 1 buoy was renumbered, the class of 12 buoys was changed, the position of 4 buoys was changed, and 5 buoys were recovered. Repairs were made to 68 buoys. Some 1,400 pounds of chain, 130 second and third class shackles, 10 ballast balls, 38 links, 6 eyebolts, 7 wear plates, and 318 split keys were purchased. The following-named buoys and appendages were received from the general light-house depot, Tompkinsville, N. Y.: Twenty-five first-class, 75 second-class, and 73 third-class shackles; 4 second-class can buoys, 3 second-class nun buoys; 25 second-class ballast balls; 5 first-class, 10 second-class, 18 third-class, and 3 fourth-class iron sinkers; 8 ballast balls for bell buoys; 71,650 pounds of buoy chain; 5 bridle chains; 1 whistling buoy; 2 whistles, and 2 bell buoys.

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DEPOTS.

—. *Castle Pinckney, Charleston Harbor, South Carolina.*—No repairs were made at this depot, which is in fairly good condition. The structures are on a low level, of insufficient size, and are unsafe in great storms.

—. *New depot for Sixth light-house district.*—In the last annual report it was stated that efforts to procure a suitable site for this depot, at a cost which would leave funds from the appropriation of $35,000 made by the act approved March 3, 1899, for the construction of the necessary wharves and buildings, had been unsuccessful, but would be continued. All efforts having proved unavailing, the War Department was requested to authorize the adaptation of old Fort Pinckney, Charleston Harbor, South Carolina, for use by the Light-House Establishment as a depot. This permission having been granted, the earth filling over the parapet and casemates of the fort was removed, and leveled to the height of the top of the casemates to furnish an area upon which to erect a storehouse, an oil house, and a keeper's dwelling. Plans for these structures are being made with a view to their erection by contract.

—. *Old Post-Office Building, Charleston, S. C.*—Work upon the alterations necessary to fit the lower part of this building for a lamp shop and the upper part as offices for the inspector was begun in April, 1900, and at the end of the fiscal year had been nearly completed.

TENDERS.

Wistaria.—This iron side-wheel steamer was built in 1881–1882, and is of about 450 tons gross burden. She replaced and relieved 362 buoys, repaired 23 buoys, recovered 10 buoys, changed and repainted 724 buoys, repaired 132 buoy chains, put new disks in 9 bell buoys, and new chafing fenders on 4 whistling buoys, and was employed at the depot 12 days. During each quarter she supplied the light-vessels with their fuel, rations, and supplies, and transported the inspector on various inspection trips. She towed the following-named light-vessels as stated: Frying Pan Shoals light-vessel No. 1, from her station to Southport and return; Charleston light-vessel No 34, from her station to Charleston and return; Martins Industry light-vessel No 53, twice from her station to Charleston and return; relief light-vessel No. 29, twice from Charleston to Martins Industry Shoal and return, to Charleston and return, and to Frying Pan Shoals and return; in all, 16 trips and a total of more than 800 miles of sea towing. She steamed some 13,400 miles, of which 8,955 miles was at sea, and consumed some 905 tons of coal and 5 cords of wood. She was in motion 60 days, some 281 days under steam, and about 84 days without fire. She had steam in her donkey boiler some 33 days. On September 22, 1899, this vessel was taken to Wilmington, Del., for repairs, at which time the following-named work was done: The filling pieces aft of wheelhouse, the forward deck, the deck beams, and the guards aft of wheelhouse were renewed, all braces were straightened, and the bulwarks were repaired. An auxiliary feed pump with two fresh-water tanks of about 5,000 gallons capacity were supplied, the connections of the main boiler were soft patched, and the main engine was lined up. Repairs were made to the steam valves around the circulating air pump, the steam steering engine, the hand-hole plate, the donkey feed pipe, and the forecastle ventilator. The exhaust pipe from the winch, one set of crosshead jibs,

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the water-column pipe, the anchor-davit plate, the after awnings, four small awnings, the pilot-house awnings, and one valve-stem arm were renewed, the compasses were adjusted, and one anchor trip, 36 grate bars, and 8 rubber valves and springs were supplied. The *Wistaria*, although 18 years old, will, when furnished with a new boiler, be good for a number of years' service in inland waters, or as a relief vessel. But to buoy the 21 sea entrances included in the 500 miles of seacoast of this district, efficiency requires a modern light-draft seagoing tender.

Pharos.—This wooden schooner, which was purchased in 1854, and rebuilt in 1872, is of about 168 tons gross burden. She was docked and her copper was patched, a leak in the centerboard wall was calked, the main chains were repaired, the sides were calked, the rigging was lifted and set up, and general repairs were made. She was employed on the repairs for Tybee and Venus Point in moving the structures of the front beacon at Hilton Head, South Carolina, light-station to the site of the rear beacon, in making repairs to St. Johns River light-station, and the range beacons at St. Johns River, Florida, entrance. She was also employed at Little Cumberland Island light-station, and on construction work at Bull Bay, South Carolina, light-station.

Water Lily.—This wooden 65-foot twin-screw naphtha launch was built in 1895, and is of about 33 tons gross burden. She steamed some 5,870 miles, and consumed about 3,220 gallons of naphtha. She was used in inspecting 73 light-stations and all the post lights and beacons in the Savannah and St. Johns rivers; in rebuilding 9 post lights and beacons; in repairing 7 post lights and beacons; repainting 10 post lights, and in supplying 38 light-stations. She was used in relieving and replacing 11 buoys and recovering 2 buoys, and in rebuilding 2 and repairing 4 light-station boats. Her crew did some 40 days' work on light-vessel No. 34, 25 days' work on light-vessel No. 53, and 20 days' work on light-vessel No. 29.

Snowdrop.—This wooden naphtha launch was built in 1896, and is of 32 tons gross burden. She was on the marine railway, and had her copper carried 6 inches higher, her propeller bearings rebabbitted, her bright work scraped and painted, and general repairs made. She was used in repairing the beacons and dwelling of the South Channel Range, Charleston, S. C., Harbor, and in making investigations as to improving the lights of the Oyster Beds, Georgia, range. She was also employed in building new Hog Island Channel beacons, repairing Mount Pleasant range beacons, and in making examinations and surveys at old Fort Pinckney, S. C., for a new light-house depot. She was further employed at Bull Bay light-station, in making inventory of light-house property of the Sixth light-house district, and in examining for repair a building at Mount Pleasant, S. C., to be used as a dwelling for the keeper of the Mount Pleasant range and the Hog Island beacons; also in the reconstruction of the old post-office building at Charleston, S. C., and on the repair of the keeper's dwelling at Mount Pleasant. She steamed some 2,100 miles during the year.

WAR TELEPHONE LINES.

The telephone line between Georgetown and South Island, South Carolina, the line between Charleston and Charleston light-station, South Carolina, and the line between St. Augustine and St. Augustine light-station, Florida, are in good condition and general use.

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istrict extends from a point just south of Jupiter Inlet light-o and including Perdido entrance, Florida. It embraces all avigation on the sea and Gulf coasts of Florida, and on other ters tributary to the sea and Gulf between the limits named.
ctor.—Lieut. Commander Nathaniel R. Usher, United States o October 31, 1899; since then, Commander Frederic Singer, States Navy.
neer.—Lieut. Col. A. N. Damrell, Corps of Engineers, United Army.
e are in this district—

buses and lighted beacons	64
nlighted beacons	54
ng buoys in position	8
ys in position	6
noys in position	284
Laurel, buoy tender, and for supply and inspection	1
Mangrove, buoy tender, and for supply and inspection	1
Arbutus, for construction and repair in the Seventh and Eighth dis-	1

LIGHT-STATIONS.

Hillsboro Inlet, off Hillsboro Point, between Jupiter Inlet and y Rocks lights, Atlantic coast of Florida.—The following recom-ation, which has been made in several previous annual reports Board, is renewed:

establishment of a light at or near Hillsboro Point, Florida, would be of assistance to all vessels navigating these waters. Steamers bound south-after making Jupiter Inlet light, hug the reef very closely to avoid the cur-The dangerous reef making out from Hillsboro Inlet compels them to give ide berth and to go out into the Gulf Stream. Vessels coming across from ahama Banks would be able to verify their position if a light were placed -a difficult matter in case they fail to make Jupiter Inlet. The establishment a light would complete the system of lights on the Florida reefs. The Board fore renews the recommendation that $90,000 be appropriated for this purpose.

3. Carysfort Reef, on Carysfort Reef, Florida.—New machinery been made to replace the revolving machinery of this light.
. Hawk Channel beacons, between Key West and Miami, Fla.—tract was made for the erection of 18 lighted beacons in Hawk nnel, Gulf of Mexico, between Miami and Key West, Fla. All of materials were purchased, the beacons were framed, two schooners e employed and loaded, and the work was begun in May, 1900. r beacons were built and two more are partially constructed. ey are located:
One in 9 feet of water at the entrance to Cape Florida Channel o Bay Biscayne, Florida; one in 14 feet of water near Soldiers Key, orida; one in 8½ feet of water on Bowles Bank, Florida; one in 11 t of water on Margot Fish Shoal, Florida; one in 10 feet of water Caesars Creek, Florida; one in 6 feet of water near Carysfort Reef ht-station, Florida. They are square pyramidal wooden struc-res, the upper part latticework, resting on four piles protected by

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cast-iron water pipe filled with cement mortar. They are fitted with hoisting gear for raising and lowering the light and keeping it steady, and each has a lamp house on its platform. They have not yet been lighted.

922. Hen and Chickens Shoal beacon, Florida.—A fixed red lens-lantern light was first displayed from this structure on the night of October 1, 1899.

924. East Turtle Shoal beacon, Florida.—A fixed white lens-lantern light was first displayed from this structure on the night of October 1, 1899.

925. East Washerwoman Shoal beacon, Florida.—A fixed white lens-lantern light was first displayed from this structure on the night of October 1, 1899.

928. Four Foot Shoal beacon, Florida.—A fixed white lens-lantern light was first displayed from this structure on the night of October 1, 1899.

932. Key West, Gulf of Mexico, Florida.—Materials were purchased and part of them were delivered for use in scaling, scraping, and painting the light tower.

941. Sanibel Island, entrance to San Carlos Harbor and port of Puntarasa, Fla.—Repairs were made commencing October 25, and were completed December 9, 1899. The station was then in order. The tower was scaled, scraped, and painted, the lower part metallic brown, and the upper part black. A wharf was built out 168 feet, with T-head at the outer end and a boathouse at the inner end. The boathouse was connected with the wharf by a platform and fitted with steps leading to the water. A new roof was put on the oil house and the entire structure was painted.

943. Gasparilla Island (rear), entrance to the harbor, Florida.—The repairs at this station were completed September 30, 1899. Slate roofs were put on the keepers' dwellings, laid on tarred paper, with hips covered by terra-cotta ridge tiles laid in cement mortar. An addition was built to the wharf resting on iron-pipe piles, taking it out to deep water. The boat davits were repaired and a slip was constructed for hauling out the boats. Other repairs were made. Repairs were made to the revolving machinery of the light.

944. Charlotte Harbor, near the middle of the harbor, Florida.—The ironwork was scaled, scraped, and painted. An oil house was built under the keeper's dwelling. It is suspended on iron rods just above the platform. The landing platform under the dwelling was repaired. The roof was put in order and other repairs were made. The color of the light was changed to fixed white.

947. Egmont Key, entrance to Tampa Bay, Florida.—The upper and lower galleries of the keeper's dwelling were rebuilt. A slate roof was put on and various repairs were made. Twelve new brick piers were built under the galleries. A platform was built connecting the dwelling and the kitchen, and the roofs of the buildings were extended and joined together. The washhouse was rebuilt. The entire building was painted. New brick walks were built from the dwelling to the tower and from the dwelling to the wharf, and a new wooden incline from the wharf to the brick walk. The wharf and the deck were repaired. Under the special appropriation of $3,500 for an assistant keeper's dwelling, plans and specifications were prepared, contract was made, and the dwelling was completed in December,

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1899. It is a two-story frame structure, with a one-story extension. It contains a parlor, dining room, kitchen, bedrooms and storeroom on the first floor, and two bedrooms on the second floor. It has a slate roof and galvanized iron gutters. It has a cistern connected with the kitchen by a galvanized iron pipe. The grounds around the new building are well graded and surrounded by a cypress picket fence, with one double and two single gates.

948. Mullet Key Shoal beacon, Tampa Bay, Florida.—Materials were delivered for use in repairing this beacon.

950. Indian Hill beacon, Tampa Bay, Florida.—Materials were delivered for use in repairing this beacon.

952. South Cut upper light, entrance to Old Tampa Bay, Florida.—This beacon was removed to a new site to permit the dredging of the new channel at the entrance to Old Tampa Bay. It was rebuilt in 26 feet of water on the east side of the dredged channel on which work is progressing. The focal plane is 50 feet above mean high water.

North Cut upper light, entrance to Old Tampa Bay, Florida.—This beacon was taken down and stored in the depot at Egmont Key and the light was shown from the Engineer dredge working on the new channel.

954. Long Shoal beacon, Hillsboro Bay, Florida.—Materials were purchased and delivered for use in repairing this beacon.

955. Middle Ground beacon, between Depot Key and Ballast Point, Hillsboro Bay, Florida.—Materials were purchased and delivered for use in repairing this beacon.

956. Barrel Stake, at the entrance to the cut leading to Tampa, Hillsboro Bay, Florida.—Materials were purchased and delivered for use in repairing this beacon.

957. Snead Point Shoal beacon, Florida.—Materials were purchased and delivered for use in repairing this beacon.

958. Manatee River Cut beacon, Tampa Bay, Florida.—Materials were purchased and delivered for use in repairing this beacon.

962. Cedar Keys, on the eastern end of the mound on Sea Horse Key, harbor of Cedar Keys, Fla.—The revolving machinery was thoroughly repaired.

963. Turning Point beacon, entrance to Cedar Keys Harbor, Florida.—The top of the beacon was changed and the light arranged to hoist and lower. The color of the light was changed from red to white.

965, 966. Carrabelle River range beacons, at the entrance to the dredged channel, mouth of Carrabelle River, Florida.—These beacons, which were blown down in August, 1899, were repaired by putting on diagonal braces, cap logs, pyramid posts, slats, lantern frame and lamp house, and two new ladders. Both structures were painted black.

967. Crooked River (front), St. George Sound, Florida.—A small house was built around the staff of this light. It is weatherboarded on the outside and covered with galvanized iron, and has a trapdoor in the top for hoisting and lowering the lantern of the range beacon through. It was painted white.

968. Crooked River (rear), St. George Sound, Florida.—A plank walk 30 feet long was built across the bottom of the tower. A galvanized-iron roof was put on the oil house. A plank walk 153 feet long was built from the front fence to the main wharf. A boathouse

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was built in place of the one destroyed by the storm. It is located on the west side of the wharf, at the inner end on the water's edge. A pair of boat ways 25 feet long with five rollers was built adjoining the boathouse. The wharf knocked down by the storm was rebuilt. It is 417 feet long and rests on 3-inch galvanized pipe with 7-inch flanges. It has a T-head at the outer end 20 feet long, and outside of the T-head three 20-foot coppered fender piles are driven and bolted to the T-head. A work shed was built adjoining the tool house.

969. Six Foot beacon, in 6 feet of water in westerly end of St. George Sound, Florida.—A platform was built, 16 braces were put on the piles, the lantern deck was leveled up, new hoisting machinery was furnished and installed, and the beacon was painted. Various repairs were made.

970. Porter Bar beacon, on the southerly point of Porter Bar, westerly end of St. George Sound, Florida.—A platform was built, 16 braces were put on foundation piles, two ladders were furnished and put in position, and a lamp house was built on the deck of the beacon. A set of hoisting gear was furnished and installed. The entire structure was painted.

971. Bulkhead Cut (front) beacon, Apalachicola Bay, Florida.—A new beacon was built to replace the old one destroyed by a storm on August 1, 1899. It is a square, black, pyramidal structure covered by horizontal slats, standing on four piles protected with yellow metal. The light was changed from white to red. New hoisting gear was furnished.

972. Bulkhead Cut (rear) beacon, Apalachicola Bay, Florida.—Foundation piles were driven alongside the old ones, to which they were bolted. A new pyramid was built, 17 feet higher than the old one. The structure was painted. The color of the light was changed from red to white. A new set of hoisting gear was furnished.

974. Apalachicola Bay (front), in front of the town of Apalachicola, Florida.—A set of hoisting gear was furnished.

975. Apalachicola Bay (rear), on the east bank of Apalachicola River, Florida.—A set of hoisting gear was furnished.

976. St. Vincent Bar beacon, in 4 feet of water in edge of St. Vincent Bar, Florida.—A square, black, pyramidal wooden beacon, supporting piles protected by yellow metal, and the pyramid covered by horizontal slats, was built in 4 feet of water about 150 feet from the port side of the channel going in. It has two ladders leading from the platform to the water and a lamp house resting on the platform. It will show a white 5-day lens-lantern light with a focal plane 45 feet 4 inches above mean high water.

977. Cape St. George, on Cape St. George, near Cape St. George Sound, Florida.—Materials were furnished for the use of the keeper in building a storm house.

978. Cape San Blas, Gulf of Mexico, Florida.—The property and material stored at Blacks Island was cared for by a watchman appointed for that purpose. Minor repairs were made. By the sundry civil appropriation bill approved June 6, 1900, an appropriation of $15,000 was made for completing the removal of Cape San Blas light-station to a new and safe site. A survey was made of the locality for the purpose of selecting the best and most available location.

979. St. Joseph Point, in St. Joseph Bay, at or near St. Joseph Point, Florida.—By the act of July 1, 1898, $15,000 was appropriated for

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establishing a light-station here. A survey was made of the entire peninsula of St. Joseph, and the site of the light was located. Plans and specifications for the structure are being made.

980. St. Andrews Bar (front) beacon, Florida.—This beacon is a pine mast 12 inches square and 24 feet high, tapered at the top to 7 inches square, and braced at the bottom with timber 4 inches by 6 inches, 16 feet long. It supports a crosshead, to which the hoisting gear is rigged and which will support the light. It will show a red 5-day lens-lantern light, the focal plane of which will be 27 feet above mean high water.

981. St. Andrews Bar (rear) beacon, Florida.—This beacon is a pine mast 12 inches square, 38 feet high, tapered to 7 inches at the top, and securely braced with timbers 4 inches by 6 inches, 16 feet long. It supports a crosshead rigged with hoisting gear, from which will depend the white 5-day lens-lantern light. The focal plane of the light will be 45 feet above mean high water. This beacon, with the preceding one, forms a range for crossing the bar at the entance to St. Andrews Bay. They are both located on land.

982. St. Andrews Bay (front) beacon, St. Andrews Bay, Florida.—This beacon was built to serve as a range for running the channel into upper St. Andrews Bay, Florida, after crossing the outer bar. The structure is a triangular pyramid of horizontal slats resting on a platform which supports an oil house, the supporting piles being protected by yellow metal. It stands in 10 feet of water and is painted red. It is fitted with hoisting apparatus, and will show a red 5-day lens-lantern light, with focal plane 30 feet above mean high water.

983. St. Andrews Bay (rear) beacon, St. Andrews Bay, Florida.—A triangular black pyramid of horizontal slats resting on a platform which supports an oil house. The supporting piles are protected by yellow metal. It stands in 5 feet of water, 1,690 feet in rear of the front range beacon, and with it serves as a range for running the channel into upper St. Andrews Bay. It will show a white 5-day lens-lantern light with focal plane 42 feet above mean high water.

986. Santa Rosa Sound beacon (front), Florida.—Contract will soon be made for the building of triangular beacons at different points, of which this is one. It is to serve with the rear beacon as a range for crossing the bar from Choctawhatchee Bay into Santa Rosa Sound.

987. Santa Rosa Sound beacon (rear), Florida.—This beacon will be similar in construction to that preceding this, with which it will form a range as above stated. A contract for its erection will be made at once.

988. Deer Point beacon, off Deer Point, near quarantine station, Pensacola Bay, Florida.—Plans and specifications were prepared for the erection of a triangular wooden beacon off Deer Point. The contract will be made at an early date.

991, 992. Caucus Channel beacons (front and rear), to mark the new cut channel at the entrance to Pensacola Bay, Florida.—The War Department having reported that this cut was completed, the lighting of the channel was ordered. Two range beacons will be built in place of the old structures. Specifications and plans were prepared, and contract will be made at an early date.

993. Fort McRee (front), southwesterly from the ruins of Fort McRee, Florida.—The removal of this beacon slightly to the west-

ward, to cover the best water across the bar, has been ordered. The work will be done as soon as a vessel is available. It is to be equipped with a new 5-day lens lantern, and the color of the light will be changed to red.

994. Fort McRee (rear), in the lagoon, 850 feet WNW. in the rear of the front range beacon, Florida.—Material has been purchased for use in raising the focal plane of this light about 7 feet. It is to be equipped with a 5-day lens lantern, and the color of the light will be changed to white.

995. Fort Barrancas (front) beacon, on the beach near Fort Barrancas, Florida.—This beacon is to be moved slightly to the westward. It is being furnished with hoisting gear and a 5-day lens lantern. The color of the light will be changed to red.

996. Fort Barrancas (rear) beacon, on the bluff near Fort Barrancas, Florida.—This beacon is to have the top changed and be equipped with a new 5-day lens lantern and new hoisting gear. The color of the light will be changed to white.

997. Devils Point beacon, west side of Escambia Bay, Florida.—Material has been ordered for equipping this beacon with hoisting gear and a five-day lens lantern.

998. White Point, in 11 feet of water, at the anchorage in mid-channel, southeasterly from White Point, East Bay, upper part of Pensacola Bay, Florida.—Material has been ordered for equipping this beacon with hoisting gear and a 5-day white lens-lantern light.

999. Middle beacon, East Bay, upper part of Pensacola Bay, Florida.—Material has been ordered for changing this day beacon into a lighted beacon. It will be rebuilt and furnished with hoisting gear and a 5-day lens-lantern light.

1000. Escribano Point, 1 mile northerly from Escribano Point, Pensacola Bay, Florida.—Material has been ordered for use in repairing this beacon and equipping it with improved hoisting gear and a 5-day lens lantern.

The following recommendation, which was made in the Board's last annual report, is renewed:

It appears that Mr. W. M. Quinn, while keeper of Cape San Blas, Florida, light-station, during the gale of October, 1894, lost all the property he had at the light-station. An itemized account, amounting to $124.75, was transmitted through the inspector of the light-house district, who recommends that the keeper be indemnified in the sum claimed by him. The Board therefore recommends that an appropriation of $124.75 be made for this purpose.

—. *Reimbursement of George L. Long, assistant keeper at Cape San Blas light-house, Florida, for losses sustained during the hurricane of October 8, 1894.*—A statement of the losses sustained by this assistant keeper, to the amount of $75, approved and recommended by the inspector of the Seventh light-house district, was sent by the Secretary of the Treasury to the Speaker of the House of Representatives in his letter of April 20, 1900, with recommendation that reimbursement be made. The Board recommends that an appropriation of this amount be made therefor.

REPAIRS.

Repairs, more or less extensive, were made at the following named stations:

936. Northwest Passage, Fla.
938. Rebecca Shoal, Fla.
945. Mangrove Point Beacon, Fla.
946. Peace Creek Beacon, Fla.

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SURVEYS.

Cape San Blas, Florida.—A survey was made to definitely locate the most desirable site to which the station can be removed.

St. Joseph Point, Florida.—A complete survey was made and the old reservation, supposed to have been washed away in 1851, was located and its boundaries were marked.

DAY OR UNLIGHTED BEACONS.

Terraceia Bay beacons, Florida.—Material was ordered and delivered, and two of these beacons are now being changed from day marks to lighted beacons. This is being done by driving two additional piles, putting up a triangular platform with a lamp house, and by installing hoisting gear and a 5-day lens-lantern light. The beacons that are being changed are Nos. 1 and 9.

Port Shoal, entrance to Little Manatee River, Florida.—This beacon was carried away in November, and was rebuilt in May, 1900. It is a black stake with cross arm, and stands on the shoal on the port side of the entrance to Little Manatee River, Florida.

Point Pinelos beacon, southeast point of Pinelos Shoal, Tampa Bay, Florida.—Material was ordered for repairing and lighting this beacon. It will be furnished with hoisting gear and a 5-day white lens-lantern light.

St. Vincent Sound beacon, Apalachicola Bay, Florida, and four range beacons at St. Andrews Bay, Florida, have not yet been lighted, but are all ready for the installation of the lanterns. They are, in the meantime, being used as day marks.

BUOYAGE.

A sea buoy, black No. 1, was established at Biscayne Bay. The following-named buoys were discontinued and beacons were erected in their places: Molasses Reef, red second-class nun buoy, marked "Molasses" in large white letters; Fowey Rocks, black No. 1, second-class can buoy, north end of Florida Reefs; red first-class nun buoy marked in white letters "Cape Florida." The second buoy, entrance to Hawk Channel, a second-class can, black and white perpendicular stripes, was taken up and replaced by a first-class bell buoy, and its name was changed to Hawk Channel entrance bell buoy. The Ragged Keys buoy, a third-class, red No. 2, nun, was taken up and replaced by a second-class nun buoy. The Outer buoy, East Pass, Apalachicola, a second-class can, with black and white perpendicular stripes, was replaced by a first-class can. During the year 11 buoys, including 1 bell buoy, were lost. Three buoys were recovered. Nineteen of the spare buoys are being repaired at the light-house depot.

DEPOTS.

Key West buoy depot and coal shed, Gulf of Mexico, Florida.—Alterations were made to the coal shed to fit it for taking and storing coal. The blacksmith shop is in good condition. The following-named work was done during the year by the light-house depot force: 143 second-class shackles, 85 third-class shackles, 39 first-class pins, 222 second-class pins, 176 third-class pins, 91 first-class keys, 215

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second-class keys, 311 third-class keys, and 86 bushings were made; 16 buoys were bushed, 34 were repaired, stovepipes were made for 4 light-stations, 3 eyebolts, 17 block pins, 2 guard irons, 4 chain shackles, 1 firehook, 1 wrench, 12 chain hooks, 6 chain cutters, 12 cleaning hammers, 6 heavy hammers, 4 steel pins, 6 cold chisels, 2 pairs of grains, 2 set screws, 2 stanchions, 2 reversing springs, 3 copper bolts, 2 staples, 1 slice bar, 1 lazy bar, 3 chain nippers, and 16 slide rings were made for the tenders; new ash pans and new bridge walls were put into the tender *Mangrove;* 1 gambling iron, 2 copper chain plates, 1 bobstay, and 2 clamps were made for light-house boats, and 47 joints of stovepipe and 6 elbows were made for issue to light-stations. The stores and property of the Light-House Establishment were removed from the navy-yard at Pensacola and from the buoy shed at Dry Tortugas to this station.

Egmont Key, entrance to Tampa Bay, Florida.—Repairs to the coal shed consisted in building a trestle 200 feet long by 12 feet wide and 14 feet high, resting on 19 trestles, and leading from the front end of the coal shed to the end of the wharf. It was painted metallic brown after completion. Nine brick piers were built under the shed. Eight new stringer pieces were put in wharf and other repairs were made. Sills were put under one end and the sides of the buoy shed and one-half of the northwest side was rebuilt. Forty brick piers were built under the foundation of the shed. The whole building was whitewashed. Various repairs were made.

Tortugas Harbor, Fort Jefferson, Gulf of Mexico, Florida.—The old buoy shed was turned over to the Navy.

TENDERS.

Mangrove.—This steel twin-screw steamer was built in 1897, and is of 600 tons gross burden. She was used for buoyage and inspection work. During the epidemic of yellow fever this vessel was anchored out in the stream as all the nonimmunes of her crew were attacked by yellow fever. In November, 1899, this vessel was hauled out on the steam ways in Tampa and her bottom cleaned and painted with anticorrosive and antifouling paints. Since December 6, 1899, the vessel was continuously employed relieving buoys, making inspection trips and supplying lights. Her crew cleaned and painted 80 buoys, changed 61 buoys, and worked 35 days at the depot. The *Mangrove* steamed some 8,291 nautical miles and consumed about 800 tons of bituminous coal. The hull of the vessel is in good condition; her bottom needs cleaning and painting. Her last docking was done in November, 1899. Temporary repairs are being made; all guages were tested, a new safety valve was installed, the main feed pipe is being renewed; leaks in boilers are being caulked; all the work done is with a view of having the vessel ready for service while the tender *Laurel* is under repairs.

Laurel.—This wooden twin-screw steamer, of 312 tons gross burden, was built in 1876, and was repaired in 1898. With exception of 22 days which time the *Laurel* was employed by the International Ocean Telegraph Company, and a short time during the epidemic of yellow fever with which all of the nonimmune members of her crew were attacked, the vessel was constantly employed relieving buoys, carrying the inspector on an inspection trip to the reef light-stations, and supplying the latter with rations. During this period the *Laurel*

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steamed about 4,749 nautical miles and consumed some 375 tons of bituminous coal. She relieved 226 buoys, cleaned and painted 226 buoys, and worked 53 days at the light-house depot. This tender is in need of extensive repairs. Bids for making these repairs have been asked.

Arbutus.—This wooden twin-screw steamer was built in 1879, and is of 400 tons gross burden. She was engaged during part of the year in delivering materials and assisting in repairs to light-stations. She delivered materials for use in erecting St. Andrews Bay beacons and repairing beacons in Tampa Bay; assisted in the taking down and erecting at the new site of the Upper South Cut beacon, Tampa Bay, Florida, and in the survey of Cape San Blas and St. Joseph Point.

Clover.—This wooden schooner was built in 1889, and is of 268 tons gross burden. She was engaged during a short time only in this district. She visited and brought materials away from Key West, Rebecca Shoal, Northwest Passage, Anclote Key, Cedar Keys, St. Marks, and Crooked River light-stations. She sailed 2,301 miles during the year, was docked once when slight repairs were made, was laid up on January 30, 1900, and was sold after being stripped of her furniture and fittings.

Tender for the engineer of the Seventh light-house district.—The following recommendation made in the Board's last two annual reports is renewed:

The construction and repair service of the Seventh and Eighth districts is now done by one wooden steam vessel and chartered sailing vessels. The coast line of these two districts is about 1,400 miles long, equal to the Atlantic coast line from Eastport, Me., to Cape Canaveral, Florida. There should be another efficient steam tender for use in the Seventh district. It is estimated that one can be built and fitted out for $85,000, and it is recommended that an appropriation of this amount be made therefor.

HIRED VESSELS.

Henrietta Sharit.—This schooner was hired at the rate of $5 per day for about two months, and was engaged in assisting with repairs to beacons in Apalachicola Bay, the delivery of materials at Crooked River, Florida, light-station, and the building of St. Vincent Bar beacon, Florida.

Cleopatra.—This vessel was hired at the rate of $3 per day for about four months, and has been engaged in assisting in erection of St. Andrews Bay beacons, and in delivering materials and assisting in work on Terraceia Bay beacons, Tampa Bay, Florida, and in the erection of Port D Shoal beacon, entrance to Little Manatee River, Florida.

EIGHTH DISTRICT.

This district extends from but does not include Perdido Entr Florida, to the southern boundary of Texas. It embraces all ai navigation on the Gulf coast of the United States and tidal w tributary to the Gulf between the limits named, together with t on the Mississippi River below New Orleans and on Grand Lake Lake Chicot.

Inspector.—Commander Albion V. Wadhams, United States N to September 30, 1899; Commander Washburn Maynard, United S Navy, to December 6, 1899; since then Commander James R. Selfri United States Navy.

Engineer.—Lieut. Col. A. N. Damrell, Corps of Engineers, Un States Army.

In this district there are—

Light-houses and beacon lights, including 30 post lights on the Mississipp River, Grand Lake, and Lake Chicot	
Light-vessels in position	
Day or unlighted beacons	
Fog-signal operated by steam	
Fog-signals operated by clockwork	
Gas-lighted buoys in position	
Whistling buoys in position	
Bell buoys in position	
Other buoys in position	
Steamer *Pansy*, buoy tender, and for supply and inspection	
Steamer *Arbutus*, for construction and repair in the Seventh and Eighth districts	

LIGHT-STATIONS.

1001. Sand Island, off Mobile Point, Gulf of Mexico, Alabama. The work of placing rock protection around this light tower was co tinued and completed. The work consisted in putting in positi around the tower 3,894 tons of rock weighing from 10 pounds to 3 pounds each piece; 3,054 tons of rock weighing from 3 to 5 tons eac and 2,797 barrels of oyster shells. The material was placed imm diately around the tower, except on the south side, where the prote tion was of large rock, with the interstices filled with small roc extended out about 50 feet with the small rock and oyster shel Around this for about 15 feet was a wall of large rock forming a bu wark to hold the small rock and shells in place. The erosion of the island has, however, continued, and some of the protection has sunk very much; so to maintain the work it was found necessary to put in about 1,600 tons more of large rock. By the act approved June 6, 1900, Congress authorized a contract not to exceed $65,000 for rebuilding this light-station when made necessary by continued encroachment of the sea.

1003. Mobile Point beacon, Mobile Bay, Alabama.—As this beacon was of little use as a day mark in crossing the outer bar at the entrance to Mobile Bay, it was furnished with a pyramid of horizontal slats, painted red with black stripe.

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1004. Mobile Point, Mobile Bay, Alabama.—The keeper's dwelling was repaired. Some 120 feet of new cypress fence was built. It is 5 feet high and has two gates. Two sheets of iron were taken from the tower around the steps and new iron put in its place. A new iron band was put on the lower edge of the cylinder of the tower. A new hand rail was built on the walk leading to the sea wall.

1005 to 1023, except 1010 and 1020. Mobile Ship Channel lights, Alabama.—Repairs were made to the fender piles of all of the 16 beacons; two new ladders were made and installed on each beacon; all of the hoisting gear was overhauled, and the doors of the lamp houses were rehung. On light No. 10 the four supporting columns were repaired by inserting 5-inch pipe filled with cement mortar. Similar repairs were made to two columns of light No. 2. Additional fender piles are to be put down on corners of the beacons opposite the channel, and the materials for the work have been purchased.

A study was made of the different methods of lighting this channel, but nothing has been discovered that promises better results than the present method. The lights are attended, trimmed, and filled three times each week. They are suspended and furnished with guide bars and guide ropes to steady the lanterns, and a hood to prevent overheating of the oil in hot weather. A system of checking the effectiveness of the lights, by having nightly reports made by the keepers of Battery Gladden, Mobile Bay, and Mobile Point light-stations, on all beacon lights visible from their stations, giving the condition of the weather at the time of the observation, etc., has shown that the beacons are kept in proper condition, and that the lights can be seen as far as they are needed as aids to the navigation of this ship channel.

1024. Horn Island Pass beacon, Gulf of Mexico, Mississippi.—Materials were purchased and with the assistance of a hired vessel a red square wooden pyramidal beacon, the upper part of which is latticework, was built in 19 feet of water in Horn Island Pass, Mississippi, in range with fairway buoys for entering Mississippi Sound through this pass. A fixed red, 5-day, lens lantern light, was established on the structure and was first exhibited on February 15, 1900. The focal plane of the light is 30 feet above mean high water.

1025. Horn Island, on the east end of Horn Island, Mississippi.—Materials were purchased and delivered at the station. The wharf was rebuilt. The dwelling was overhauled and repaired and a new cistern was installed. Various minor repairs were made.

The hill on which the light stands is being washed rapidly. A survey shows the light to be in danger. Hence orders were given for its removal to a site in the water about 300 feet north of its present location, where it will stand on wooden piles, incased in terra-cotta pipe filled with cement mortar. All of the material has been purchased and part is being loaded on a hired schooner for transportation to the site and commencement of the work.

1026. Round Island, off Pascagoula, Mississippi.—The dwelling was repaired. The tower was put in good order. The wharf was extended out 120 feet, and the old part of the wharf was repaired. A new boathouse was built on six galvanized iron pipe piles with 7-inch flanges. Several plank walks were built.

1027. Round Island Spit Beacon, Mississippi.—The hoisting gear and the lantern were installed and tested, and a fixed red 5-day lens-lantern light was first shown on the night of February 15, 1900.

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1031. Ship Island, Mississippi.—Materials were purchased and delivered and various repairs were made. Leaks in the light tower were stopped. The boathouse and new boat ways were rebuilt. Some 1,120 feet of plank walk 2 feet wide was built from the keeper's dwelling to the range beacons, and between the range beacons.

—. *Pearl River, on the east bank of the river, about seven-eighths of a mile below the railroad bridge, Mississippi Sound, Mississippi.*—The following recommendation, made in the Board's last six annual reports, is renewed:

An appropriation of $250 was made by the act approved on March 2, 1889, for the establishment of a light at this point. Continuous but unsuccessful effort has been made to obtain title to a site on which a proper structure could be erected. The difficulty is that the owner can not give such a title as the Government can accept. The legal costs of condemning a site would probably exceed the appropriation. The Board therefore recommends that Pearl River be included in the general appropriation for lighting rivers, when under its provisions a site for the light can be leased and the light can then at once be established.

1032. South Channel front beacon, Ship Island, Mississippi.—A small platform was built at the base of the beacon with a lamp locker.

1033. South Channel rear beacon, Ship Island, Mississippi.—A small platform was built at the base of the beacon with a lamp house.

1034. Biloxi, at Biloxi, entrance to Biloxi Bay, Mississippi.—The tower was overhauled and put in good order. A brick walk was laid from the tower to the roadway. A stable, washhouse and chicken house were built in place of the old ones which were removed. Brick walks were laid from the dwelling to the front gate; from the L of the dwelling; around the cisterns; from the back gallery to the storehouse, and from the storehouse to the carriage shed. The dwelling was put in good order.

1035. Cat Island, Mississippi.—The keeper's dwelling and the wharf were repaired. The entire station was painted. Contract was let for rock ballast for filling under and around this station. The rock is to be so placed as to be 4 feet high all around under the dwelling and slope gradually from the foundation piles out. Some 215 tons were placed.

1037. Lake Borgne, near Lower Point Clear, Mississippi.—A platform was built under the keepers dwelling. The foundation was scaled, scraped, and painted. A new plank walk 2 feet wide and 48 feet long was laid. The planking on the wharf was taken up; 60 gas-pipe piles were taken up, the ends plugged and put down again, and the capping, braces, and planking were renewed. The boathouse was repaired.

1038. Long Point bacon, near Rigolets off Long Point, Louisiana.—A black, triangular, pyramidal, wooden beacon, supported on three piles incased in terra-cotta pipe filled with cement mortar, with a lamp house on the platform, and a ladder for mounting from the water to the platform was built about 700 feet from the beach on the starboard side going into the Rigolets off Long Point, Louisiana. The hoisting gear was installed and a lantern was furnished and tested, but the structure is not yet lighted. It will show a white light with a focal plane 30 feet above mean high water.

1040. Pointe aux Herbes, 7 miles WSW. of West Rigolets, La.—Materials were delivered by a hired vessel. The breakwater was extended and wings were built on the ends. The piling, sheet piles, inside and outside stringers were repaired. The boat and store house,

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a building 13 feet by 20 feet was rebuilt. It rests on six piles, is sheathed on the outside and the cracks battened, and it has a shingled roof. It is fitted with a window and a door. The foundation of the keeper's dwelling was repaired. The entire outside of the dwelling was whitewashed. Various minor repairs were made.

1041. Bayou Bonfuca beacon, Lake Pontchartrain, Louisiana.—A black, triangular, wooden, pyramidal beacon, with the upper part lattice work, and supporting piles protected by terra-cotta pipe filled with cement mortar, was built in 4 feet of water about 700 feet from the beach on the port side of the entrance to Bayou Bonfuca, Louisiana. A lamp house stands on the platform, and it has a ladder leading from the water to the platform. The hoisting gear was installed and the lantern was furnished and tested, but the structure is not yet lighted. It will show a fixed white 5-day lens-lantern light with a focal plane 30 feet above mean high water.

1042. Bayou Lacombe beacon, Lake Pontchartrain, Louisiana.—A black, triangular, pyramidal, wooden beacon, the upper part lattice work, and supporting piles protected by terra-cotta pipe filled with cement mortar, was built in 4 feet of water about 700 feet from the beach, on the port side of the entrance to Bayou Lacombe, Lake Pontchartrain, Louisiana. It has a lamp house on the platform and a ladder. Hoisting gear and a lantern were furnished and tested, but the structure is not yet lighted. It will show a white five-day lens-lantern light with a focal plane 30 feet above mean sea level.

1043. Port Pontchartrain, near Milneburg, La.—Repairs were made to the revolving machinery. The light is to be changed to fixed white. Complete repairs are to be made to this station and part of the materials have been purchased.

1045. New Canal, 5 miles north of New Orleans, La.—Plans and specifications were prepared for complete repairs and materials were purchased and the work is now being done.

1046. Chefuncte River, at the west side of the mouth of Chefuncte River, Louisiana.—Materials were delivered and repairs to this station are being made.

1047. Pass Manchac, at the mouth of Pass Manchac, between lakes Maurepas and Pontchartrain, Louisiana.—The materials for the repair of this station were purchased and delivered by a hired schooner.

1049. Chandeleur, Lake Pontchartrain, Louisiana.—The assistant keeper's dwelling was repaired. A new platform was built between the two dwellings. A new platform was built under the keeper's house to serve as a workshop. The plank walks and cistern and the oil house were repaired. The tower was scaled, scraped, and painted, two coats outside and one inside. The iron storm door was repaired and a new door was put at the entrance to the tower. Other minor repairs were made.

1052. South Pass East Jetty, mouth of the Pass, Louisiana.—About 5,000 barrels of oyster shells were placed around the foundation. They are from 4 to 5 feet deep and extend about 2 feet above mean high water. The foundation appears to be secure.

1055. South Pass Rear, South Pass, Louisiana.—The color of the light tower confused vessels trying to make the Passes, as it was similar to the color of the light tower at Southwest Pass. This tower

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was therefore scaled, scraped, and painted white. It has a black lantern.

1057. Head of Passes, on Deer Island, at junction of Southwest and South Passes, Louisiana.—The boathouse and wharf were damaged by the steamship *Imaum* in November, 1899. Complete repairs were made at a cost of about $500 and the bill thereof was paid by the owners of the steamer. Various repairs were made.

1060. Cubits Gap light and fog-signal, Mississippi River, below New Orleans, La.—The following recommendation, made in the Board's last three annual reports, is renewed:

The keeper is now living in a rented building, which is barely habitable, and is the only one available. A keeper's dwelling seems to be urgently needed. It is estimated that a suitable structure can be erected for not exceeding $2,500, and it is recommended that an appropriation of this amount be made therefor.

1082. Timbalier, entrance to Timbalier Bay, Louisiana.—The wharf was extended out 330 feet. It is 8 feet wide and is fitted with a T at the end, 10 feet by 18 feet in plan. The boathouse was rebuilt near the end of the wharf in deeper water. The foundation of the keeper's dwelling was braced and spiked with 12-inch spikes. The oil house was braced with timber and spiked down to the foundation with 12-inch spikes. Various repairs were made.

—. *Oyster Bayou, Gulf of Mexico, Louisiana.*—The following recommendation, made in the Board's annual reports for 1894, 1897, 1898, and 1899, is renewed:

This bayou opens into the Gulf of Mexico, and is the entrance island for all small craft engaged in the oyster, fish, and other industries. The vessels, something over 300 in number, supplying the four oyster packers at Morgan City, pass through Oyster Bayou. Vessels frequently attempt to make the bayou at night, and, lacking a light to indicate the entrance, sometimes sail 5 or 6 miles beyond it before discovering their mistake. It is therefore proposed that a light-house be placed here. Oyster Bayou is a recognized inside channel. If vessels did not pass through it, they would have to go around Pointe au Fer and the Southwest Reef light house to reach Morgan City, thus taking an outside route very dangerous for small vessels. The mouth of the bayou is exposed to the severe storms of the Gulf, which, at times, bank the water up to a height of 6 or 7 feet above the ordinary level and sweep over the place in violent waves. Hence it will be necessary to place the light-house on iron piles in order to raise it above the reach of storm waves. The station should be established on the point formerly occupied by the private light maintained there by certain oyster packers of Morgan City. It should consist of a keeper's dwelling, from the top of which should be shown a white light from a lens-lantern. It is estimated that this could be built at a cost not to exceed $5,000. Recommendation is made that an appropriation of this amount be made therefor.

1083. Ship Shoal, on Ship Shoal, Gulf of Mexico, Louisiana.—Plans and specifications for the metal work needed for use in repairing this station were prepared, and bids therefor were asked by advertisement.

1084. Southwest Reef, entrance to Atchafalaya Bay, Louisiana.—The tower and the foundation were scaled, scraped, and painted black. The fog-bell tower was also scaled, scraped, and painted. Various repairs were made.

1094. Mermenteau River, Gulf of Mexico, Louisiana.—Action under the special appropriation of $7,000, made by the act approved on July 1, 1898, for building a light here, was deferred pending the dredging of a channel at the mouth of the river.

1095. Calcasieu, entrance to Calcasieu River, Louisiana.—A boat house was built on the bank of the river. A 2-foot plank walk extends around the inside. A plank walk, 1,540 feet long and 8 feet wide, was built from the keeper's dwelling to the boathouse. A platform was

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built adjoining the tower, and a covered way was built between the tower and the kitchen. Excavation was made under the kitchen and 90 feet of mud sill put down. Six pine pillars were put under the foundations and braced to the sills and pillars. Various minor repairs were made. Ditches were dug to carry off water inside the premises; sand was wheeled from the river bank and the grounds inside the fence were filled up and graded so water will not stand on them.

1096. Sabine Pass Jetty beacon, entrance to Sabine Pass, Louisiana.—A wharf was built out 45 feet resting on six galvanized pipe piles and two wooden piles. The wooden piles are protected by yellow metal.

—. *Sabine Pass Jetty light and fog-signal station, Louisiana and Texas.*—The following recommendation made in the Board's last annual report is renewed:

> The protecting mat of the east jetty extends out about 4 miles. and the nearest light to its entrance is a small beacon light about 1¼ miles inside the end, too far inside to serve as a guide to the entrance of the jetty. Sabine Pass as a port of entry has grown rapidly. The receipts and shipments for 1896 and 1897 show an increase from $199,042 in 1896 to $475,288 in 1897. It appears from the records that 99 vessels entered and cleared during 1897, that there were 403 trips made. and that 104,333 was the net registered tonnage. The largest vessel which passed out drew 23.6 feet. The Board therefore deems that the needs of this port requ re the establishment here of a light and fog-signal. It is estimated that a suitable structure here, similar to the one at Brazos Santiago, Texas, can be built for $40,000. It is therefore recommended that an appropriation of this amount be made therefor.
>
> The House of Representatives Committee on Appropriations called for suggestions from the Treasury Department as to the propriety of passing H. R. bill No. 11357, appropriating $40,000 for the establishment of a light-house at Sabine Pass, and was informed by letter of February 9, 1899, that the Treasury Department recommended the passage of the bill in question.

1097. Sabine Pass on Brandt Point, east side of the entrance to Sabine Pass, Louisiana.—The keeper's dwelling was repaired, and various other repairs were made.

—. *Sabine Bank light and fog-signal station, Gulf of Mexico, Texas.*—By the sundry civil act approved June 6, 1900, an appropriation of $40,000 was made for establishing a light and fog-signal station at this place, and authority was given to contract for the construction of this light and fog-signal station at a cost not to exceed $80,000. The Board therefore recommends that a further appropriation of $40,000 be made for this purpose. The plans therefor are being prepared.

1098. Galveston Jetty, Texas.—Plans and specifications for the erection of a light-house and fog-signal near the end of the north jetty at the entrance to Galveston, Tex., was prepared.

1099. Galveston North Jetty, entrance to Galveston Harbor, Texas.—A wharf was built 70 feet long by 8 feet wide, resting on piles protected by yellow metal. A boathouse was built on the end of the wharf, resting on four piles protected by yellow metal. A platform and a locker for storing oars, oar locks, etc., was built inside. Yellow metal was put around the piles of the beacon, a galvanized pile was driven to which the keeper fastened his boat while tending the light, and a ladder led from the platform to the water.

1104. Bolivar Point, north side of the entrance to Galveston Bay, Texas.—The old iron fence was replaced by a cypress picket fence 5 feet high and 1,750 feet long, with water table and baseboard, and it is fitted with six single and three double gates and was painted metallic brown. The keeper's dwelling was put in good order. The cisterns were inclosed and covered with a flat roof, and the inclosure

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and the cisterns were painted. Between the brick pillars, under the foundation of the house, 22 panels of lattice work were placed. Brick walks were laid around the cisterns and cemented, and the brick walk leading to the tower was cemented. A new galvanized-iron roof was put on the oil house. The tower was thoroughly overhauled. Various minor repairs were made.

1105. Fort Point, Galveston Island, Texas.—The keeper's dwelling was scaled and scraped, and all ironwork was painted. The lower part was painted with red lead, and then the whole iron structure was painted mineral brown. The lantern was also scaled, scraped, and painted. An oil house was built on the platform under the dwelling. Various repairs were made. The boathouse was rebuilt. A wharf was built from the boathouse to the railroad track on the jetty.

1107. Halfmoon Shoal, Galveston Bay, Texas.—A platform 20 feet square was built under the dwelling. This platform supports the oil house and two iron water tanks. The fog-bell striking machinery was overhauled and repaired. Various repairs were made.

1108. Red Fish Bar Cut, Galveston Bay, Texas.—Under the special appropriation of $8,000, this station was built in about 2 feet of water on Red Fish Bar, Galveston Bay, to the easterly side of the dredged cut through the bar, and a fixed white light of the fifth order was established in it on March 20, 1900. It consists of a square iron pile foundation, painted brown, surmounted by a square white dwelling, with green door and window blinds, from the roof of which there rises a black lantern. The fog-bell is on the gallery of the dwelling on the side next the cut.

1109. Red Fish Bar, on Red Fish Bar, Galveston Bay, Texas.—This old station is partly dismantled, but as it is used by small schooners and vessels, which do not use the dredged cut, a 5-day red lens-lantern light was installed, and is now maintained there. This was damaged by fire, and replaced by an 8-day lantern.

1111. Brazos River Jetty light-station, entrance to Brazos River, Texas.—A ladder 14 feet long was installed. A plank walk was laid from the beacon to the jetty. A white shelter house was built for the keeper of the fog-signal and range beacon, adjoining the beacon on the west side, and connected with it by a gallery. It consists of two rooms, with a gallery and a cistern. It has a shingle roof, and stands in the river on piles, protected by wooden jackets filled with cement mortar. Various repairs were made.

1112. Brazos River, Texas.—The tower was scaled, scraped, and painted. Some 5 cubic yards of filling was placed. Some 350 feet of brick walk 3 feet wide was built. A picket fence was built in front of the station 188 feet long. The wharf was repaired. Various repairs were made to the keeper's dwelling. A brick pavement, 884 feet, was laid. Some 50 feet of sewer pipe was put down from the dwelling to the outside of the fence. The dwelling, inside and out, was painted. Repairs were made to the assistant keeper's dwelling. Various repairs were made.

1113. Matagorda, Matagorda Island, entrance to Matagorda Bay, Pass Cavallo, Texas.—The tower, dome, and gallery were chipped, scraped, and painted black. Stanchions were made and put up and a netting of copper wire rope was built around the lantern to keep off flying birds. The gallery of the keeper's dwelling was raised, brick piers were built, and the gallery was rebuilt with new sills, fascia,

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joists, and flooring. The wharf was extended out to deep water. The boathouse was rebuilt where the water was deeper. Various repairs were made.

1114. Aransas Pass, on Low Island, inside of Aransas Pass, Texas.—Materials for use in repairs to the station were purchased and delivered.

1116. Point Isabel, south end of Laguna Madre, Texas.—A second-order brick oil house was built.

—. *Reimbursement of light-keepers for losses sustained during the hurricane of October 1, 1893.*—The following recommendation, which was made in the Board's last six annual reports, is renewed:

Statements of these losses to the amount of $2,603.62, approved and recommended by the inspector of the Eighth light-house district, were sent by the Secretary of the Treasury to the Speaker of the House of Representatives in his letters of March 7 and April 3, 1894, with recommendation that reimbursement be made. The Board recommends that an appropriation of this amount be made therefor.

REPAIRS.

At each of the following-named stations repairs more or less extensive were made during the year:

1036. Merrill Shell Bank, Miss. | 1056. Southwest Pass, La.

SURVEYS.

Choctaw Point, Alabama.—A survey was made of the reservation at Choctaw Point, Alabama, and the boundaries marked.

Ship Island, Mississippi.—A survey was made at this station to ascertain the condition of the reservation, and how much danger there was from encroachment of the sea.

Horn Island light-station, Mississippi.—A survey was made at this station and platted, showing the encroachment of the sea on the reservation.

Sand Island light-station, Alabama.—A survey was made and measurements taken to ascertain the condition of the rock protection, and how fast the sea was encroaching.

LIGHT-VESSELS.

1051. South Pass light-vessel, No. 43, moored in 82 feet of water off the South Pass entrance to Mississippi River, Louisiana.—This composite light-vessel was built in 1880-81, is of about 187 tons gross burden, shows a fixed white light, and has a 12-inch steam whistle for a fog-signal.

On August 10, 1899, this vessel was removed from her station for August, September, and the first half of October, and was replaced on October 28, 1899. While off her station new windlass brakes were furnished and pump brakes repaired, a yellow-pine foregaff was fitted. The forward lamp house was retinned, roofed and fitted with a new collar. The deck of the lamp house was covered with sheet lead and retinned. New fore rigging and head stays were furnished. The flooring in both coal bunkers was renewed. Four boat chocks were raised 12 inches and were securely fastened. Two galvanized iron water tanks were furnished with pipe connections. During the past winter the tubes in both boilers leaked so badly that sufficient steam could not be carried to give a proper blast of the whistle, hence tubes

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were furnished, and put in place by the force on board vessel. Some 30 tons of anthracite coal was furnished.

1103. Galveston light-vessel, No. 28, inside of Galveston Bar, Gulf of Mexico, Texas.—This wooden light-vessel was built in 1888, is of about 101 tons burden, shows a fixed red light, and has a bell for a fog-signal. She is in good condition. The fore trysail gaff will be renewed. A bell, a whale boat, and a set of main deck awnings were furnished.

DAY OR UNLIGHTED BEACONS.

Sand Island day beacon, Alabama.—This day beacon was again moved to prevent its being carried away by the sea, which is undermining the beach.

The north breaker beacon at Galveston, Texas, was destroyed.

Twenty-four day marks were built in Mobile Ship Channel, Alabama, consisting of three pine piles with bark on driven in a cluster and with heads bound together at top.

St. Joseph Island beacon, on St. Joseph Island, Mississippi Sound, Mississippi.

A square, pyramidal, wooden beacon, upper part latticework, supporting a latticework ball, was built in 7 feet of water about 78 feet SW. by W. ¾ W. from the center pillar of the old St. Joseph light, which light was situated on the south point of St. Joseph Island.

FOG-SIGNALS OPERATED BY STEAM OR HOT AIR.

1051. South Pass light-vessel, No. 43, Louisiana.—This 12-inch steam whistle was in operation about 379 hours and consumed some 28 long tons of anthracite coal.

BUOYAGE.

The following-named buoys and appendages were received during the year: Six second-class nun buoys, 6 third-class nun buoys, 9 third-class can buoys, 6 first-class stone sinkers, 18 second-class stone sinkers, 6 third-class stone sinkers, 25 third-class buoy shackles, 180 fathoms 1-inch buoy chain, and 180 fathoms 1½-inch buoy chain. Four gas buoys were maintained in the entrance to Galveston Bay during the year. A lantern was furnished one of these buoys. The light on north gas buoy was changed from fixed white to fixed red. These buoys were established: Two third-class nuns, to mark Dog Keys Pass, between Ship and Horn islands, Mississippi; 4 third-class nuns, in Sabine Pass, Louisiana and Texas, and 1 third-class can at the same place; 1 second-class nun to mark the wreck of the steamer *Meteor*, at Pass Cavallo, Texas; and 3 third-class nuns to mark the dredged channel at the entrance to Pearl River, Mississippi and Louisiana. These buoys were discontinued, the wrecks having been removed: The wreck of the *City of Waco* buoy, off Galveston entrance, Texas, and the buoy marking the wreck of a burned schooner about one-half mile southerly from entrance to dredged channel into East Pascagoula River, Mississippi.

DEPOTS.

Depot at or near Mobile, Ala.—Under an appropriation of $12,000 for the erection of a depot at or near Mobile, Ala., an effort was made to exchange the reservation at Choctaw Point, Ala., for another site

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of equal value and equally as well or better adapted for the purpose. A survey was made of the reservation, and its boundaries were marked.

Port Eads, Louisiana.—The landing for tenders at the buoy wharf was extended by driving a row of piles below the wharf and belting them to braces resting against the row of piles driven near the bank.

TENDERS.

Pansy.—This iron twin-screw steamer, which was built in 1878, is of 343 tons gross burden. She cared for the buoys, delivered fuel, provisions, and supplies to the light-houses, and conveyed the inspector on his quarterly visits of inspection to the lights. She delivered annual supplies to the light-stations in Lakes Borgne and Pontchartrain. She erected three new post lights on the Mississippi River below New Orleans, and moved four; the crew cut 10 acres of willows which obstructed the views of the post lights. The vessel was docked and the hull below the water line received two coats of Rahtjen's antifouling paint. Extensive repairs were made to the engines, which put them in order. About 50 feet of the main fore-and-aft keelson was placed. While the vessel was under repair an inspection of the hull showed that under the ceiling in the wardroom a number of the webs of the angle-iron frames were nearly eaten away by rust, and on the port side, underneath forward air port, a plate was rusted entirely through. A reinforced plate was placed over this weak spot. New deck, plank-sheer, etc., will be placed. A 25-foot whaleboat was furnished. The tender steamed about 10,640 miles, and consumed some 710 long tons of coal.

Tender for the Eighth light-house district.—A new steam tender for buoyage, supply, and inspection is needed for this district. The tender *Pansy* is old and worn, and she is too small to properly attend to the work required of her. Complaints have been made that the buoys of the district have not been kept up as they should be, and it is impossible to do the work with the *Pansy*. This tender has not sufficient draft for the heavy weather in the Gulf of Mexico, and too much to enter any of the harbors westward of the passes excepting Sabine Pass, Galveston, and Aransas Pass, and she can not carry coal enough to permit her to keep at sea in that locality if unable to enter port.

It is estimated that $125,000 will be required for the construction of a suitable tender. Recommendation is therefore made that an appropriation of that amount be made therefor.

Arbutus.—This twin-screw wooden steamer was built in 1879, and is of 400 tons gross burden. She was engaged the greater part of the year in delivering materials at light-stations in this district, as follows: Mobile Point, Alabama; Timbalier, Calcasieu, Head of Passes, South Pass light-stations, Louisiana; Red Fish Bar, Bolivar Point, Fort Point, Halfmoon Shoal, Brazos River, Brazos River Jetty, Aransas Pass, and Matagorda light-stations, Texas. She visited and inspected Barataria Bay, Timbalier, Ship Shoal, Calcasieu, Sabine Pass, and Southwest Reef light-stations, Louisiana, and Galveston Jetty, Fort Point, Bolivar Point, Halfmoon Shoal, Red Fish Bar, Brazos River Jetty, and Brazos River light-stations, Texas. She steamed about 8,527 miles and consumed some 480 tons of coal. She was docked twice and the following-named repairs made: One plank was taken out on the water line for purpose of inspection; it was replaced and

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fastened and calked. The old stem and rudder were removed and new ones were installed. A set of stanchions were placed. The old bulwarks were taken out and new ones put in. A streak of four planks all around was taken out and the covering board removed; repairs were made to vessel timbers and new planks and covering board put back and calked. Twenty-four new deadlights were put in. Repairs were made to the decking, and it was recalked where required. Two new booby hatches were made and installed. Two sets of steps were made and put in place forward and aft. New screens were made and put in the chart room. New flushing tanks were put in and connections made. A new ice box was made, lined with zinc, and put in place. Other minor repairs were made. A new steam windlass was purchased and installed. Repairs to boilers, engines, etc., consisted in making new joints of rainbow gum on the steam chests, putting in a socket bolt in the shell of the boiler, repairing the exhaust pipe of the hoisting engine and suction pipe for the donkey pump to the feed tank. A new steam valve was put on the donkey pump. Side delivery valves were overhauled, and new joints were made to the ship's sides, and pipes were connected therewith. The starboard engine was taken down, trued up, new connections made, and it was put up again. The propeller wheels were taken off, as they were badly bent, and new ones were put in their places. Various minor repairs were made to the engines.

Clover.—This wooden schooner was built in 1899 and is of 268 tons burden. She was employed most of the year in delivery of materials and assisting in repairs to stations in this district. She delivered materials at the followingnamed light-stations: Horn Island and Round Island, Mississippi; Calcasieu, Timbalier, Sabine Pass, and Sabine Pass Jetty light-stations, Louisiana; and Galveston Jetty, Bolivar Point, Fort Point, and Halfmoon Shoal light-stations, Texas. She delivered materials and built 24 day marks in Mobile Bay. The schooner was docked and repaired. Mention of laying her up and selling her is made in that part of this report which relates to the Seventh light-house district.

Tender for Mobile Ship Channel, Alabama.—For several years past the 20 lights in Mobile Ship Channel, Alabama, were attended by chartered steamers. These lights make the channel which the Government cut through Mobile Bay useful at night. They are placed on either side of the channel from one end to the other. The lights are supposed to burn for 60 hours, and would, but for occasional collisions by passing vessels, floating logs, etc., which jar them so that they go out. It is necessary, therefore, that each light be visited as nearly as possible every 24 hours, not only to clean the outside of the lanterns from incrustations of salt from evaporated salt water, which give the light a veiled aspect, but also to fill the receivers with oil to replace that which has been thrown out by collision, and, in general, to keep the lights in such condition as to give the best illumination. After several years' experimentation with chartered tugs, the Board deemed that it would be in the interests, not only of commerce and navigation, but of economy, to provide a small steel steamer of proper size, proper power, and proper appliances for this special work. There are in Mobile Bay and Harbor 6 iron nun and can buoys, a bell buoy, a whistling buoy, and 11 wooden day beacons, all of which could be cared for by this steamer, thereby relieving the overworked tender for

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the whole district from this work. The steamer could also be made of great use in connection with the establishment of the light-house depot in this harbor, for which an appropriation of $12,000 has been made. It is estimated that a suitable steamer can be provided, under present conditions of labor and material, at a cost not exceeding $40,000. The Board has the honor to ask that the proper measures may be taken to obtain an appropriation of that amount for this purpose.

HIRED VESSELS.

Lester.—This small schooner was hired for two months for use in connection with repairs to Halfmoon Shoal light-station, Texas.

Wanderer.—This vessel was employed most of the year in connection with delivery of materials at Biloxi, Cat Island, Ship Island, and Lake Borgne light-stations, Mississippi, and New Canal, Pass Manchac, Pointe aux Herbes, Chandeleur, and Chefuncte River light-stations, Louisiana. She delivered materials and assisted in erecting beacons at Bayou Bonfuca, Bayou Lacombe, and Long Point, Louisiana, and installing hoisting gear on Horn Island Pass and Round Island Spit beacons, Mississippi. She is now being loaded with materials for Horn Island light-station, Mississippi.

NINTH DISTRICT.

This district includes all aids to navigation on Lake Michig Green Bay, and tributary waters lying west of a line drawn acr the Straits of Mackinac just east of Old Mackinac Point light-stati Michigan.

Inspector.—Commander F. M. Symonds, United States Navy.

Engineer.—Capt. James G. Warren, Corps of Engineers, Uni States Army.

There are in this district—

Light-houses and beacon lights 1
Light-vessels in position 1
Fog-signals operated by steam 1
Fog-signals operated by clockwork 1
Gas-lighted buoys in position 1
Bell buoy in position 1
Other buoys in position 1
Steamer *Dahlia*, buoy tender, and for supply and inspection 1
Steamer *Arcadia*, engineer's tender for repairs and construction, under charte from July 1, 1899, to November 20, 1899.
Steamer *Alice M. Gill* from May 1, to June 30, 1900.

NOTE.—The number preceding the name of a light-station in the Ninth, Tenth, Eleventh districts, and that portion of the Third district on Whitehall Narrows, and the United States waters of Lakes Champlain and Memphremagog is that by which it is designated in the List of Lights and Fog-Signals of the United States on the Northern Lakes and Rivers, corrected to the opening of navigation, 1900.

The light-stations of this district were inspected and found to be in efficient condition. The coast lights and fog-signals south of and including South Fox Island on the east, and the coast lights and fog-signals south of and including Seul Choix Pointe on the west coast of Lake Michigan, were kept in operation during the winter, except the Seul Choix Pointe station, which was closed on February 5, 1900, and South Fox Island station, which was closed on December 22, 1899. The light and fog-signal at Old Mackinac Point were kept in operation until the ice in the straits was solid, when the steam ferry running between Mackinaw City and St. Ignace having made a channel, they were no longer needed.

LIGHT-STATIONS.

395. Old Mackinac Point, Straits of Mackinac, Michigan.—The proceedings in condemnation begun last year have not yet been finished. Various repairs were made.

402. Waugoshance, Lake Michigan, Michigan.—The fog-signal boilers were sent to the station. The fog-signal house was nearly completed. The engines were overhauled and changed from 60 to 120 revolutions, but the characteristic was maintained. Various repairs were made.

407. Petoskey beacon, Lake Michigan, Michigan.—Two fixed lantern lights, red above white, were established on the northern end of the west breakwater on the night of July 1, 1899. A timber protection 6 feet high was built at the north end of the breakwater, and the oil house was moved from the rear of the beacon to a position nearer the

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shelter. The angle of the timber protection was inclosed to form a storehouse. The beacon which was damaged by the schooner *Willie Loutit* on June 11, 1900, was repaired.

410. Grand Traverse, Lake Michigan, Michigan.—A 10-inch steam fog-signal whistle was established on December 20, 1899. The material for a fog-signal building was sent to the station. The boat landing was widened and repaired for 40 feet. A site was cleared for the fog-signal building. The brickwork of the walls was built, etc., and the construction was completed in November, 1899. The fog-signal boilers and machinery were moved into the fog-signal building, piped and fitted for operation. The building is a substantial brick structure, built of buff pressed brick, showing the finished surfaces of wall inside as well as outside. The roof is of metal tiles, painted red, and has a brick chimney. A lightning rod was placed on the tower. Various repairs were made.

412. North Manitou, Lake Michigan, Michigan.—Three State-tax land deeds of the State of Michigan, completing the title to the site for North Manitou light-station, Michigan, were recorded. The boat-house was moved across the point, a crib for a boat landing was built, boat ways were put in, and a walk laid from the crib to the boat-house. A frame barn and wood shed were built. Various repairs were made.

414. Point Betsey, Lake Michigan, Michigan.—The tower and dwelling were painted white to make the tower a better day mark. The roofs were painted red. Various repairs were made.

415, 416. Frankfort pierhead range, Lake Michigan, Michigan.—The fog-bell striking apparatus was removed and shipped to St. Joseph Light-House depot, and the repaired apparatus from Chicago Pierhead was installed in its place. An engine was purchased, measures were taken for its installation in the tower, and the work will be completed soon. A life line, consisting of 360 feet of five-eighths-inch galvanized wire rope and 15 iron posts was erected on the pier for the protection of the keeper in passing to and from the pierhead light.

417, 418. Portage Lake pierhead range, Lake Michigan, Michigan.—A life line was erected on the pier from the beacon shoreward, 500 feet long, consisting of 22 wrought-iron posts and five-eighths-inch galvanized iron rope, as a protection for the keeper in going to and from the light.

The following recommendation, made in the Board's last four annual reports, is renewed:

> This station consists of two lights on the Government pier, but there is no dwelling here for the keeper. It is estimated that an appropriate structure can be erected for $3,500, and it is recommended that an appropriation of this amount be made therefor.

419. Manistee pierhead, Lake Michigan, Michigan.—This light was changed on June 1, 1900, from a lens-lantern light to a sixth-order 180° lens. The light in the end of the conduit was discontinued and the conduit was taken down. The fog-signal building was moved some 260 feet lakeward and placed on a 2-foot superstructure about 42 feet from the outer end of the pier. An octagonal lantern was placed on the front gable of the fog-signal building and the new sixth-order light was established therein, and a watch room was erected beneath it. Some 250 feet of elevated walk were built. The whistle

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and sound deflector were raised some 4 feet, so as to clear the lantern. Various repairs were made.

420. Manistee, Lake Michigan, Michigan.—Some 6,000 bricks for building an oil house were provided. Various repairs were made.

421. Grande Pointe au Sable, Lake Michigan, Michigan.—Improved third-order burners were installed. Detailed plans and specifications for the metal-tower casing were prepared, and a contract was made on December 14, 1899. The metal work was completely constructed, erected in the shops and inspected, and was delivered, and the work was completed in June. The work of encasing the tower consisted of covering the entire shaft of the tower with a series of 18 metal cylinders, each cylinder stepping back from the one immediately preceding. The cylinders were reenforced top and bottom by steel angles riveted to the plates, and vertical steel angles at the joints of the plates forming each cylinder. The space inside of these cylinders was filled with concrete as the work progressed, making one entire mass of the whole work. This novel construction, which was adopted to avoid building a new tower, or more extensive repairs, will prevent leakage and the disintegration of the brick work.

423, 424. Ludington pierhead range, Lake Michigan, Michigan.—A contract was made for the construction of a keeper's dwelling. The War Department was asked for the land needed for a site for the dwelling. The dwelling was begun in May and it is to be completed by August 1, 1900. A plank walk 230 feet long was placed on the cross-ties of the harbor pier. A new smokestack was provided and erected for the fog-signal boiler. Various repairs were made.

425, 426. Pentwater pierhead range, Lake Michigan, Michigan.—An elevated walk was built 500 feet long and 10 feet high, and another walk was built 24 feet long and 5 feet high. The pier was planked as a landing and to connect the walk that was being built on the channel side of the pier by the river and harbor engineer. Various repairs were made.

427. Petite Pointe au Sable, Lake Michigan, Michigan.—The light was provided with a set of improved third-order three-wick burners. Various repairs were made.

428. White River pierhead, Lake Michigan, Michigan.—Material for an elevated walk was delivered and 640 running feet were erected.

430, 431. Muskegon pierhead range, Lake Michigan, Michigan.—On September 15, 1899, the red-lantern light exhibited from the outer end of the elevated conduit was moved to the outer end of the pier and shown from the gable end of the fog-signal building erected there. On the same date a 10-inch steam fog-signal was established, and the fog-bell located at the rear light was discontinued. An elevated conduit of 764 running feet was taken down and replaced by an elevated walk 720 feet long, 10 feet high, and 20 feet of walk 9 feet high, passing through the open framework of the rear range tower and connecting with the old walk, making 740 running feet in all. The fog-signal building is a frame structure 20 by 40 feet, placed on a timber superstructure.

436, 437. Holland pierhead range, Lake Michigan, Michigan.—An elevated walk 160 feet long was erected. A walk 50 feet long near the shore line, that had careened considerably, was straightened up. Temporary repairs were made to the tower.

Holland is a port of entry for Grand Rapids and is doing a lake

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business, both passenger and freight, during the season of navigation. The Board is therefore of opinion that a fog-signal should be established at Holland in connection with the pierhead light. It is estimated that it can be established here for not exceeding $6,000. The Board therefore recommends that an appropriation of this amount be made therefor.

438. Kalamazoo pierhead, Lake Michigan, Michigan.—A boat platform was erected and boat davits were provided. The conduit was taken down, and the light was taken from the conduit and shown from a post, and the light was carried in and out a distance of 152 feet on a lantern carriage.

439. Kalamazoo, Lake Michigan, Michigan.—The color of the tower and dwelling was changed from white to buff. Various repairs were made.

440. South Haven pierhead, Lake Michigan, Michigan—An iron fence was put up on the Michigan avenue frontage. A 6-foot plank walk was also laid on the front. An elevated walk 144 feet long was erected on the recently built pier. Various repairs were made.

443. St. Joseph, Lake Michigan, Michigan.—An iron fence 132 feet long was erected on the front premises and the old fences were removed. Light board fences, with capping, were erected on the north and south lines. A concrete sidewalk 132 feet long was laid on the street front of the premises. A flag pole was placed on the roof of the dwelling to carry the flag clear of the lantern. Various repairs were made.

444. Michigan City, Lake Michigan, Indiana.—Some 6,000 bricks for the construction of an oil house were provided. The sundry civil appropriation act, approved June 6, 1900, appropriated $5,500 for establishing a fog-signal at this station. Plans, specifications, and estimate of cost for the new structure are being prepared.

445. Calumet pierhead, Lake Michigan, Illinois.—A boat davit was erected near the light-tower at the end of the pier. The damage done to the roof of the fog-signal building by the steamer *Penobscot* was repaired at a cost of $7.82. The bill was paid by the vessel. The fog-signal plant was repaired and the fog-signal went into commission July 1, 1899. Minor repairs were made to the keeper's dwelling.

The Board in its last annual report stated that—

> The dwelling is in a deplorable condition, unfit for human habitation. It is estimated that a new dwelling can be built for $7,500, and recommendation is made that an appropriation of that amount be made therefor.

The Board now recommends that authority be obtained from Congress to use the $7,500, appropriated by the act approved on July 1, 1898, for establishing a light-station at or near the north Government pier at South Milwaukee, Lake Michigan, Wisconsin, to establish a keeper's dwelling at Calumet pierhead, as the necessity for establishing a light at South Milwaukee is not now apparent, and the need of a keeper's dwelling at Calumet pierhead is greater than ever before.

447. Chicago breakwater (north), Lake Michigan, Illinois.—The post at this station was destroyed by the schooner *Lake Forest* on June 22, 1899. A new post, with braces, was provided, also material for a sea-wall protection. The post was erected and the work was completed on July 10, 1899. A bill for damages amounting to $30 was sent to the owners of the boat.

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448, 449. Chicago pierhead range, Lake Michigan, Illinois.—A fence was erected across the end of the north pier immediately in the rear of the beacon to exclude trespassers. Minor repairs were made.

450. Chicago Harbor, Lake Michigan, Illinois.—The boilers and engines were overhauled. Sound deflectors for both signals were provided. Various repairs were made.

452. Grossepoint, Lake Michigan, Illinois.—A flag pole 50 feet high was made, painted, and erected. A metal fence was put up on the west boundary of the lot facing Sheridan drive, and the side line fences were extended and connected with it. A concrete walk was laid in front of the premises on the Sheridan drive. An oil house was built.

453. Waukegan Harbor, Lake Michigan, Illinois.—The iron tower was erected 36 feet from the outer end of the south pier. A fourth-order light, fixed white for 20 seconds, followed by four red flashes at intervals of 5 seconds, was established on August 31, 1899, in the structure recently erected on the outer end of the south pier, at the entrance to Waukegan Harbor, and the old lantern light at the outer end of the north pier was discontinued. The elevated walk 400 feet long was completed. A life line for the protection of the keeper was put up on the pier, 1,075 running feet of galvanized wire rope and 45 wrought-iron posts being used.

Waukegan Reservation, Lake Michigan, Illinois.—The light-house reservation was sold at auction on June 20, 1899, to the city of Waukegan.

455, 456. Kenosha pierhead range, Lake Michigan, Wisconsin.—The pierhead light and conduit destroyed by a gale on November 1, 1899, were reestablished five days later on a post erected 75 feet in front of the rear beacon, with a running carriage on wire.

457. Racine Reef beacon, Lake Michigan, Wisconsin.—The construction and erection of the beacon under contract was completed ready for the installation of the gas tanks and burners in July, 1899. The contractor therefor completed the work, the tanks were charged with gas on August 31, 1899, and the light was exhibited that night for the first time. Two cords of old building stone were taken from Twin River Point light-station and placed around the crib at Racine Reef as protection. A gas tank of small capacity was replaced by a larger one. About 81 cords of riprap stone were deposited around the foundation as a protection.

460. Wind Point, Lake Michigan, Wisconsin.—Three holes 12 feet deep were drilled to provide additional water supply for the fog-signal boilers. Materials were purchased for a new fog-signal plant. The erection of a fog-signal building was begun and excavations were made for the foundation walls. Various repairs were made.

462. Milwaukee breakwater, Lake Michigan, Wisconsin.—Two fixed lantern lights, red vertically above white, were on October 11, 1899, moved 874 feet southerly and established permanently on the southerly end of the completed breakwater.

The following recommendation, made in the Board's last annual report, is renewed:

By act of Congress approved March 3, 1899, funds were provided for the completion of this breakwater, and there is reason to believe that the work will be completed in November, 1900: meantime the Board has provided that a temporary beacon light be established upon the south end of the breakwater with two five-day lens lanterns showing a red above a white light. A permanent light for the lighting of the breakwater should be provided and should be ready as nearly as possible when the breakwater is completed. The Board is of the opinion that the

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interests of commerce and navigation require that a fourth-order light should be shown from an iron tower supported by crib and masonry foundations or by a metal caisson filled with concrete, and that a fog-signal should be operated from this point. It is estimated that such structures would cost $75,000, and it is recommended that an appropriation of that amount be made therefor.

469. Manitowoc pierhead, Lake Michigan, Wisconsin.—Some 250 feet of elevated walk that had been removed while repairs to the pier were being made by the river and harbor engineer were rebuilt. Minor repairs were made.

471. Twin River Point, Lake Michigan, Wisconsin.—A 70-foot flag pole was provided and erected. Various repairs were made.

472, 473. Kewaunee pierhead range, Lake Michigan, Wisconsin.—A life line was put up, extending 1,054 feet shoreward from the inner end of the elevated walk, for the protection of the keeper in passing to and from the light. A flagstaff 62 feet long, with masthead irons and bolts, was purchased.

The following recommendation, made in the last four annual reports of the Board, is renewed:

This station, which consists at present of range lights and a steam fog-signal, has no dwelling for the keepers. It is estimated that proper structures can be erected for $7,500, and it is recommended that an appropriation of this amount be made therefor.

474, 475. Ahnapee pierhead range, Lake Michigan, Wisconsin.—The material for the extension to the elevated walk was purchased and delivered at Racine, where the timber was framed by a working party at that place and transported to the station by the tender *Arcadia*. The boathouse was moved to the inner end of the pier, 112 running feet of elevated walk was built, making 312 feet of new walk, and minor repairs were made. A bridge joining the detached piers was abandoned and the elevated walk was reconstructed across on a line of spring piling, joining the two portions.

476. Sturgeon Bay Canal pierhead, Lake Michigan, Wisconsin.—A cast-iron pedestal base for the lens was purchased. The intensity of this light was increased by replacing the sixth-order lens with one of the fifth order. Two smokestacks were erected on the signal house. Repairs were made.

477. Sturgeon Bay Canal, Lake Michigan, Wisconsin.—Ball bearings for the lens apparatus were provided. The material for a lens pedestal and the sub-base for the pedestal were delivered at the station. A brick oil house was built for the use of all lights at the entrance and through the canal. The boathouse was moved to a temporary position until the renewal of the revetment is completed. A buoy platform 15 feet by 100 feet was built, consisting of 4-inch by 8-inch plank laid on cross-ties of 8-inch by 12-inch timber on the revetment. A contract was made for the building of a keeper's dwelling, and the work was begun.

480. Sturgeon Bay Canal, northwest entrance No. 3, Lake Michigan, Wisconsin.—On November 28, 1899, this light was moved 400 feet to the eastward and placed upon the westerly corner of the south revetment at a point 6,200 feet northwesterly from light No. 1 and 5,000 feet southeasterly from light No. 4, at the west entrance to the cut.

—. *Fisherman Shoal, Lake Michigan, Wisconsin.*—The following recommendation was made in the Board's last four annual reports.

This shoal rock, which is near Rock Island, forms a dangerous obstruction to the increasing number of vessels passing in this vicinity. It is proposed to establish a

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light and fog-signal on this shoal in the interest of this commerce. It is estimated that it can be done for $50,000, and it is recommended that an appropriation of this amount be made therefor.

Because of the great rise in building materials and the cost of working at so exposed a locality, it is recommended that the amount be increased to $75,000.

490. St. Martin Island, Lake Michigan, Michigan.—A site of about 42 acres was purchased. Plans and estimates of cost for the buildings required for the establishment of the station were prepared.

It has been found that the $15,000 appropriated by the act approved July 1, 1898, is not sufficient for the establishment of this station. Bids were advertised for and received for the metal work of the station. It was found, however, that, if accepted, the amount remaining would be insufficient for the fog-signal plant and for the buildings, etc., necessary for the complete establishment of the station. It has therefore been decided to reject all bids and to readvertise. It is now estimated that $29,000 will be required to complete this station. Recommendation is therefore made that an additional appropriation of $14,000 be made for this purpose.

—. *Little Gull Island, St. Martins Passage, entrance to Green Bay, Lake Michigan, Michigan.*—The establishment of a light and fog-signal here, at a cost not to exceed $20,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made.

The Board recommends that the amount authorized be appropriated.

—. *Pointe aux Barques (Manistique), Lake Michigan, Michigan.*—The following recommendation, which was made in the Board's last two annual reports, is renewed:

The establishment of the Lake Michigan light and fog-signal vessels, Squaw Island light and fog-signal, Seul Choix Pointe light, and the additional buoyage authorized in the northern part of Lake Michigan has made those waters reasonably safe for navigation on the route from the Straits of Mackinac to Green Bay ports, with the exception of a stretch of 45 miles between Seul Choix Pointe and Poverty Island. Pointe aux Barques is a prominent headland 24½ miles northeast one-half north from Poverty Island light, and 23 miles west-southwest from Seul Choix Pointe light. Poverty Island light is visible 16¾ miles, and Seul Choix Pointe is visible 15 miles. There is therefore a space of 13¾ miles off Pointe aux Barques not covered by any light. The town of Manistique, situated at the mouth of Manistique River, at the head of the bay between Seul Choix and Pointe aux Barques, has a large lumber trade, and many vessels call at that port. The route north of the Beavers and along the coast down to Poverty Island Passage into Green Bay is the usual route of the ore vessels to and from Lake Erie ports in northwest winds, and the shipments of ore this year from Escanaba are largely in excess, it is said, of those of any port in the world. The Board recommends that a coast light and fog-signal be established on Point aux Barques, Lake Michigan, Michigan. It is estimated that this can be done for a sum not to exceed $32,000, and it is recommended that an appropriation of this amount be made therefor.

500. Escanaba, Green Bay, Michigan.—The bell tower at the old Tail Point light-station was taken apart and landed here for erection, and also the fog bell and striking apparatus for Muskegon. The fog-bell apparatus was placed in position and tested, and the keeper was instructed in its management. The fog bell was established on May 1, 1900, near the end of Sand Point, Little Bay de Noquette.

506. Eagle Bluff, Green Bay, Wisconsin. A brick oil house with iron roof and shelving was built. Minor repairs were made.

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507. Chambers Island, Green Bay, Wisconsin.—The characteristic of the light was changed on July 15, 1899, by reducing the interval between the flashes from one minute to thirty seconds, the characteristic now being fixed white, varied by a white flash every thirty seconds. To do this a mercury float pedestal was installed. Minor repairs were made.

508. Menominee pierhead, Green Bay, Michigan.—Material for a concrete foundation for the tower was delivered. The stone was removed from the pockets in the pier under the tower, the tower was raised, all the poor timber cut out on the side next to the channel, and bags filled with concrete were placed under the tower below the water line for the footings of the foundation. A sound deflector was provided for placing it on the signal house. Repairs were made.

513. Tail Point, Green Bay, Wisconsin.—The light and fog-bell were established in the new structure August 1, 1899, and the old light and the temporary light on the pile cluster were discontinued. Some 50 cords of riprap stone were deposited around the foundation pier as a protection.

517. Elbow beacon, Green Bay, Wisconsin.—A lens lantern of 270 degrees was substituted for that of 180 degrees arc of illumination, on May 1, 1900. Various repairs were made.

519. Muryhys Dock beacon, Green Bay, Wisconsin.—A small cleaning room and lamp house taken from Grassy Island light-station was placed here. A ruby lantern for the post light was provided.

520. Menasha River, lower beacon, Little Butte des Morts Lake, Wisconsin.—A red lantern light was established on the night of July 18, 1899, in place of a white light. The beacon was destroyed by fire the next day. The light was reestablished on July 24, with a white lantern light. A 5-day lens lantern, with red chimneys, was, on August 19, 1899, shipped to the station to replace the white light. The mast and light were removed at the close of navigation and reerected at the opening of navigation in 1900.

521. Menasha River, upper beacon, Lake Winnebago, Wisconsin.—The mast and light were removed at the close of navigation season of 1899, and reerected at the opening of navigation this season.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

396. McGulpin Point, Mich.
397. St. Helena, Mich.
403. Skilligallee, Mich.
405. Beaver Island, Mich.
406. Little Traverse, Mich.
408. Charlevoix Pierhead, Mich.
409. South Fox Island, Mich.
413. South Manitou, Mich.
429. White River, Mich.
432. Muskegon, Mich.
434. Grand Haven Pierhead, Mich.
441, 442. St. Joseph Pierhead Range, Mich.
446. Chicago Breakwater, Ill.
454. Kenosha, Wis.
458. Racine Pierhead, Wis.
459. Racine, Wis.
461. Milwaukee Pierhead, Wis.
463. Milwaukee, Wis.
465. Port Washington, Wis.
466. Sheboygan Pierhead, Wis.
482, 483. Bailey Harbor Range, Wis.
484. Cana Island, Wis.
485. Porte des Morts, Wis.
486, 487. Plum Island Range, Wis.
489. Pottawatomie, Wis.
491. Poverty Island, Mich.
493. Seul Choix Pointe, Mich.
494. Squaw Island, Mich.
498. Point Peninsula, Mich.
509. Green Island, Wis.
510. Sherwood Point, Wis.
511, 512. Dunlap Reef Range, Wis.
515, 516. Grassy Island, Wis.

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LIGHT-VESSELS.

398. Simmons Reef light-vessel, No. 55, Lake Michigan, Michigan.—This wooden steam screw light-vessel was built in 1891. It is of about 130 tons gross burden, and has a 6-inch steam fog-signal. She left her station on December 15, 1899, and went to Cheboygan, Mich., into winter quarters. While there she was supplied with fuel and mineral oil.

By joint resolution of Congress, approved May 3, 1900, this vessel is to be moved to Lansing Shoal, and she will be in position on that shoal on or about July 10, 1900.

399. White Shoal light-vessel, No. 56, Lake Michigan, Michigan.—This wooden steam screw light-vessel was built in 1891, and is of about 130 tons gross burden, and has a 6-inch steam fog-signal. She left her station on December 15, 1899, and went to Cheboygan, Mich., into winter quaters. While there 3 flues were fitted into her main boiler, a patch was put on her boiler, around the blow-off pipe, 25 boiler stays were tightened, 2 square-headed bolts with nuts were fitted for the manhole plate, 2 packing screws were repaired, 1 engine link-block pin was repaired, a fusible plug was put in place, an iron sink was put in the galley, and she was planked outside of the bulwarks. She was supplied with fuel and mineral oil, and was returned to her moorings on April 21, 1900.

401. Grays Reef light-vessel, No. 57, Lake Michigan, Michigan.—This wooden steam screw light-vessel was built in 1891, and is of about 130 tons gross burden, and has a 6-inch steam fog-signal. She left her station on December 15, 1899, and went into winter quarters at Cheboygan, Mich. While there 3 flues were fitted into her main bolier, 16 boiler stays were tightened, a fusible plug was put in place, a swing check valve was fitted, new floors were laid in the chain lockers, screen doors for the watch house were fitted. She was planked outside of the bulwarks, and an iron sink was placed in the galley. She was supplied with fuel and mineral oil, and was returned to her moorings on April 21, 1900.

499. Eleven Foot Shoal light-vessel, No. 60, about midway between Eleven Foot Shoal and Corona Shoal, Green Bay, Michigan.—This wooden light-vessel was built in 1893, is of about 100 net tons burden, and has a 6-inch steam fog-signal. She left her station December 13, 1899, and went into winter quarters at Escanaba, Mich. While there she was supplied with fuel and mineral oil. She returned to her moorings on April 24, 1900.

—. *Peshtigo, Green Bay, Lake Michigan, Wisconsin.*—The following recommendation, made in the Board's last two annual reports, is renewed:

This shoal lies on the north of Peshtigo River and projects for a long distance into Green Bay. The large and important commerce of the vicinity has for many years been seriously incommoded by the lack of a reliable mark at the end of the point. It is believed that a light of some kind on the end of Peshtigo Reef, about 4 miles from the shore, would be a valuable aid to navigation. As the water deepens rapidly near the 12-foot curve, it is difficult, if not impossible, to place a gas buoy there, and the liability of such a buoy to be carried away makes the placing of one there impracticable. The establishment of a light-house on the reef itself would be a dangerous experiment, owing to the tremendous push of floating ice in that vicinity. It seems, therefore, that the only practicable way of marking this reef is to establish a light-vessel in the immediate vicinity. This can be done at a cost not exceeding $15,000, and it is recommended that an appropriation of this amount be made therefor.

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By the act approved February 15, 1893, the establishment of a light-house, with a fog-signal, at or near Peshtigo Shoal, Green Bay, was authorized, at a cost not exceeding $10,000, but as no appropriation has been made for the purpose, and as so much time has elapsed since the time of authorization, the question comes up almost as new matter.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

395. Old Mackinaw Point, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 368 hours and consumed about 47 cords of wood.

398. Simmons Reef light-vessel, No. 55, Michigan.—This 6-inch steam whistle was in operation some 272 hours and consumed about 17 tons of coal and 3 cords of wood.

399. White Shoal light-vessel, No. 56, Michigan.—This 6-inch steam whistle was in operation some 225 hours and consumed about 11 tons of coal and 2 cords of wood.

401. Grays Reef light-vessel, No. 57, Michigan.—This 6-inch steam whistle was in operation some 274 hours and consumed about 10 tons of coal and 2 cords of wood.

402. Waugoshance, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 189 hours and consumed about 9 tons of coal and 17 cords of wood.

403. Skilligallee, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 255 hours and consumed about 16 tons of coal and 14 cords of wood.

405. Beaver Island, Michigan.—This first-class steam siren, in duplicate, was in operation some 154 hours and consumed about 20 cords of wood.

409. South Fox Island, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 277 hours and consumed about 5 tons of coal and 41 cords of wood.

410. Grand Traverse, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 183 hours and consumed about 18 cords of wood. This signal was established December 20, 1899.

412. North Manitou, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 647 hours and consumed about 2 tons of coal and 58 cords of wood.

413. South Manitou, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 913 hours and consumed about 74 cords of wood.

414. Point Betsey, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 535 hours and consumed about 62 cords of wood.

419. Manistee pierhead, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 491 hours and consumed about 37 tons of coal and 2 cords of wood.

424. Ludington pierhead (rear), Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 676 hours and consumed about 51 tons of coal and 6 cords of wood.

430. Muskegon pierhead (front), Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 376 hours and consumed about 37 tons of coal and 2 cords of wood. This signal was established September 15, 1899, and the fog-bell was discontinued on that date.

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434. Grand Haven pierhead, Michigan.—This first-class steam siren, in duplicate, was in operation some 364 hours and consumed about 26 tons of coal and 1 cord of wood.

441. St. Joseph pierhead (front), Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 356 hours and consumed about 23 tons of coal and 3 cords of wood.

445. Calumet pierhead, Illinois.—This 10-inch steam whistle, in duplicate, was in operation some 464 hours and consumed about 61 tons of coal and 3 cords of wood. This signal was established July 1, 1899.

450. Chicago Harbor, Illinois.—This 10-inch steam whistle, in duplicate, was in operation some 666 hours and consumed about 88 tons of coal and 9 cords of wood.

452. Grossepoint, Ill.—This 10-inch steam whistle, in duplicate, was in operation some 343 hours and consumed about 27 tons of coal and 2 cords of wood.

460. Wind Point (Racine Point), Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 631 hours and consumed about 45 tons of coal and 3 cords of wood.

461. Milwaukee pierhead, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 911 hours and consumed about 59 tons of coal and 3 cords of wood.

466. Sheboygan pierhead, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 500 hours and consumed about 44 tons of coal and 2 cords of wood.

468. Manitowoc breakwater, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 825 hours and consumed about 60 tons of coal and 5 cords of wood.

471. Twin River Point, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 528 hours and consumed about 37 tons of coal and 6 cords of wood.

473. Kewaunee pierhead (rear), Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 608 hours and consumed about 44 tons of coal and 2 cords of wood.

476. Sturgeon Bay Canal pierhead, Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 562 hours and consumed about 57 tons of coal and 4 cords of wood.

485. Porte des Morts (Pilot Island), Wisconsin.—This 10-inch steam whistle, in duplicate, was in operation some 274 hours and consumed about — tons of coal and 57 cords of wood.

487. Plum Island (rear), Wisconsin.—This first-class steam siren, in duplicate, was in operation some 298 hours and consumed about — tons of coal and 63 cords of wood.

491. Poverty Island, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 273 hours and consumed about 18 tons of coal and 17 cords of wood.

493. Seul Choix Pointe, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 139 hours and consumed about 15 tons of coal.

494. Squaw Island, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 228 hours and consumed about 15 tons of coal.

499. Eleven-Foot Shoal light-vessel, No. 60, Michigan.—This 6-inch steam whistle was in operation some 153 hours and consumed about 7 tons of coal and 1 cord of wood.

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508. Menominee pierhead, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 240 hours and consumed about 18 tons of coal and 5 cords of wood.

BUOYAGE.

The buoyage of the district is in excellent condition, and is attended by the light-house tender *Dahlia*, except Bank Point buoy, Muskegon Lake, which is done by contract; the buoy at St. Joseph Harbor, Michigan, which is cared for by the custodian of the light-house depot, and the buoys in Green Bay, south of Long Tail Point, and the channel buoys in Fox River, which are attended to by contract.

Winslow gas buoy.—This gas buoy, marking the wreck of the barge *Winslow*, was, on October 4, 1899, found leaking, and was replaced by another with light of same characteristics. The leaky buoy received a new diaphram, and is now in good condition.

Fisherman Shoal gas buoy, Wisconsin.—In excellent condition.

Wiggins Point Shoal gas buoy, Michigan.—In excellent order.

Lansing Shoal gas buoy, Michigan.—This buoy was moved one-third of a mile SE. by S. (true) October 4, 1899, replacing the 20-foot spar buoy on Lansing Shoal rock, which rock was discovered and marked by a spar buoy September 19, 1899. It is in excellent condition.

Poverty Island Shoal gas buoy, Lake Michigan, Michigan.—In excellent condition.

Gravelly Island Shoal gas buoy, Lake Michigan, Michigan.—In excellent condition.

Whaleback Shoal, east end, gas buoy, Green Bay, Wisconsin.—In excellent condition.

Entrance gas buoy, No. 1, Green Bay, Wisconsin.—In excellent condition.

Elbow gas buoy, No. 12, Green Bay, Wisconsin.—In excellent condition.

The total quantity of gas used during the fiscal year in these buoys was about 40,000 cubic feet.

St. Joseph entrance buoy, St. Joseph Harbor, Michigan.—On September 15, 1899, this third-class red can buoy replaced the third-class black can buoy and the 20-foot red spar buoy, which were discontinued on that date.

Dahlia Shoal buoy, Lake Michigan, Michigan.—A red and white horizontally striped 20-foot spar buoy was established on this shoal on June 18, 1900. The buoy is placed $3\frac{3}{8}$ miles SSW. (true) from Skilligallee light-house, in 14 feet of water.

DEPOTS.

Charlevoix, north end of Lake Michigan.—Contracts were made for dredging the water front and slip, for back filling and grading the grounds, and for building a pile revetment. The work called for in these contracts was finished during April, 1900—4,500 cubic yards of material having been dredged and dumped into Pine Lake, 4,775 cubic yards used for back filling and grading, and 445 running feet of pile revetment constructed. Plan, general description, and estimate for a storehouse 40 feet wide by 90 feet long were prepared, and proposals for furnishing the material were invited by posters and cir-

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cular letters. The materials for the construction of the warehouse were delivered by a light-house tender.

St. Joseph, Michigan.—All supplies received from the general light-house depot and those purchased from the district and all blanks and stationery were packed and issued from this depot to the tender for distribution to the light-station. A revetment for the protection of the depot grounds from erosion by water was built by contract, consisting of 80 running feet of pile revetment. A walk leading from the boat landing to the dock under the railroad bridge was built for the light-house boats. The sand that had drifted over the fence at the light-house depot was removed. Twelve feet of galvanized conductor pipe were purchased. Minor repairs were made.

The following recommendation, made in the Board's last annual report, is renewed:

This district is the only lake district which is kept in operation during the winter. This change has been made necessary as steamers, contrary to the former custom, ran during winter months throughout more than half of the area of the district. The Board has no place where the recently chartered tender can lie and take on material for construction and repair of light-houses. This hampers and interferes with the work of the district. The light-house depots at Charlevoix and St. Joseph are not available, as they are far from the office of the engineer of the Ninth light-house district and from the best markets for material. A suitable site for a light-house depot can be purchased at or near Milwaukee. This depot would afford wharves for the light house tenders of both the light-house inspector and engineer, where they could tie up during the winter when not in use. The inspector with difficulty finds temporary accommodations at Chicago wharves for his tender. There is no place more accessible than Milwaukee where it can make its headquarters. It is estimated that a light-house depot could be established at Milwaukee for not exceeding $50,000, and the Board recommends that an appropriation of this amount be made therefor.

Engineer's storehouse, Milwaukee, Wisconsin.—A temporary storehouse, 16 feet by 100 feet in plan, with 10-foot posts, was built at the inner end of the north pier at Milwaukee, Wis. The floor is of 2-inch matched Norway, on 4-inch by 6-inch and 4-inch by 4-inch sleepers, which in turn rest upon 8-inch by 8-inch timbers, which are placed on a stone pier. The dock in front is 5 feet 8 inches wide the entire length, with steps at each end. There are four sliding doors—three facing dock south and one at the north corner for receiving local deliveries. A small office occupies the southwest corner. The east end of the structure is partitioned off for use as a lamp shop, having seven windows and one outside sliding door; also a double door connecting it with the warehouse. Seven wire guards for the windows, a heating stove, a lock with night latch, a sink, and a padlock were provided. A telephone was placed in the temporary storehouse.

DISTRICT MACHINE SHOP.

The easterly end of the temporary storehouse received interior sheathing over building paper and was fitted up as a temporary machine shop. Machinery and tools for fitting up the district machine shop were purchased. The engine was placed on a brick and cement foundation and bolted, the gasoline tank was placed on stringers outside of the building, and the milling machine and lathe were placed in position. The machinery, belting, pulleys, hangers, and shafting were placed and adjusted, and the machinery was tested and found to be satisfactory. Six malleable clamps, two 6-inch stovepipe elbows,

one length of 6-inch stovepipe, an iron casting, and patterns were purchased. A foot lathe, with drills, lathe tools, etc., was purchased for general use in the field in construction and repair work in the district.

TENDERS.

Dahlia.—This iron, screw steamer was built in 1874, and is of about 427 tons gross burden. In placing buoys, making trips of inspection, and delivering supplies, she steamed some 11,700 miles on a consumption of about 606⅓ tons of coal. A wild cat, worm wheel, worm and shaft for anchor engine were furnished. Fifty rivets were replaced in her boilers. Ten leaky socket bolts of boilers were replaced with screw bolts and washers. The passover valve was removed from the chest of the main engine and the hole was made steam tight by covering both sides with brass plates. The link and link blocks of the main engine were refitted. She was docked and cleaned and her bottom was painted with red lead and some minor repairs were made.

Sumac.—By the act approved on March 3, 1899, an appropriation of $85,000 was made for constructing, equipping, and outfitting complete for service a new steam tender for the buoyage, supply, and inspection in the Ninth light-house district. Plans and specifications were prepared and bids for the building of the steamer in accordance with them were asked by advertisement in newspapers, to be opened on June 25, 1900, but not one bid was received. It is understood that the reason for this is that the amount appropriated is insufficient to pay for the work needed. The estimates made for the cost of this vessel two years ago would have been sufficient to build her then, but the great advance in the cost of labor and the material needed in metal ship building is such that she can not be built now for less than a third more than she would have cost then. It is estimated that it will cost at least $115,000 to build this vessel now. The Board therefore recommends that an appropriation of $30,000 be made in addition to the $85,000 appropriated for this vessel by the act of March 3, 1899.

Arcadia.—This wooden, screw steamer of 230 tons gross burden, built in 1888 was chartered for use as a light-house tender. She visited the following named stations during July and delivered material or loaded material for delivering at other places: Muskegon pierhead range, Chicago Breakwater, Calumet pierhead, Milwaukee, Sheboygan, Cana Island, Eagle Bluff, St. Joseph Depot, Racine, Poverty Island, Ahnapee pierhead, Bailey Harbor range, Sturgeon Bay Canal, Squaw Point, Kewaunee, Cedar River, Point Peninsula, Plum Island range, Twin River Point, and Chambers Island.

Contracts were made for furnishing fuel for the tender for the season of 1899. She visited during August: Racine, Racine pierhead, Kenosha, Waukegan, St. Joseph, Waugoshance, Ahnapee pierhead, and Grand Traverse. The boilers were transported from St. Joseph Depot to Waugoshance and unloaded, and material for the construction of the fog-signal house was transported from Milwaukee to Grand Traverse. She was engaged during the month of September in transporting material to Grand Traverse light-station, unloading and landing the same, and transporting working party from Ahnapee pierhead range to Grand Traverse light-station. During October she transported the boilers and machinery from St. Joseph Depot to Grand Traverse light-station. Material or tools were delivered at South

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Manitou, North Manitou, Beaver Island, Skilligallee, Point Betsey, Poverty Island, and St. Joseph Depot, and material or tools were returned to Milwaukee storehouse from Muskegon, Point Betsey, Skilligallee, Poverty Island, North Manitou, and St. Joseph Depot, and a working party was transported from Point Peninsula to Tail Point. She was engaged up to November 20, 1899, in transporting riprap stone to the new Tail Point light-station and depositing it around the foundation crib as a protection. Material, etc., was delivered at Seul Choix Pointe, Tail Point, Point Peninsula, Sturgeon Bay Canal, and Green Island light-stations; and material or tools were returned to Milwaukee storehouse from Point Peninsula, Escanaba, Green Island, and Tail Point. Upon the arrival of the tender at Milwaukee, the material, tools, etc., were unloaded at the storehouse on November 20, 1899, and the services of the tender dispensed with for the season. She steamed about 4,261 miles and consumed some 260 tons of bituminous coal.

Alice M. Gill.—The steamer *Alice M. Gill*, of about 264 tons gross burden, was chartered for use as a light-house tender. The tender commenced loading on May 1, 1900, and received material from and delivered material at stations as follows: Delivered material at site for Charlevoix light-house depot, and at Mission Point, North Manitou, South Manitou, Manistee, and Grande Pointe au Sable light-stations, and loaded material at Milwaukee, Muskegon, Ludington, South Manitou, and Grande Pointe au Sable, and delivered it at site for Charlevoix depot. Received material at North Manitou, Ahnapee pierhead range, and Port Washington for return to the storehouse at Milwaukee. The charter of the steamer was extended to June 30, 1901. Articles were ordered for furnishings for the tender. She received material from and delivered material at stations as follows: Delivered material at site for Charlevoix light-house depot, at Manistee pierhead, Menominee pierhead, Sturgeon Bay Canal, Grande Pointe au Sable, Point Peninsula, Poverty Island, Porte des Morts, South Manitou, Pottawatamie, and Waugoshance. The tender also went to Detroit, Mich., and loaded 69,000 bricks and delivered 57,000 of them at site for Charlevoix depot. Twelve thousand of these were for construction of oil houses. She steamed about 2,200 miles and consumed some 139 tons of bituminous coal.

Tender for the engineer, Ninth district.—By the act approved June 6, 1900, Congress appropriated $50,000 toward the construction of a steam tender for construction and repair service in the Ninth light-house district, and authorized a contract therefor at a cost not to exceed $100,000. The failure to secure any bids for the *Sumac* leading to further inquiry, indicates that the cost of a suitable vessel will now be $115,000. The Board therefore recommends that the limit of cost be increased from $100,000 to $115,000.

TENTH DISTRICT.

his district extends from the mouth of the St. Regis River, St. rence River, New York, to the mouth of the River Rouge, Detroit r, Michigan. It embraces all aids to navigation on the United s shores and waters of Lakes Erie and Ontario and the upper part e St. Lawrence, the Niagara, and the lower part of the Detroit rs.

spector.—Commander Franklin Hanford, United States Navy.
ngineer.—Maj. T. W. Symons, Corps of Engineers, United States y.

his district there are—

-houses and beacon lights	81
-vessels in position	3
-vessel for relief	1
ignals operated by steam	9
ignals operated by clockwork	6
ighted buoys in position	23
buoys in position	142
ner *Haze*, buoy tender, and for supply and inspection	1
n barge *Warrington*, for construction and repair	1

l lights in this district, except that at Presque'ile, Pennsylva- and the range lights at Conneaut, Ohio, were extinguished, or ed to burn out at the close of navigation, at various dates between mber 13, 1899, and February 15, 1900. They were relighted be- n March 29 and April 25, 1900. The Presque'ile and Conneaut ts were maintained at intervals during part of the winter, when ired, for the benefit of a car ferry line from Conneaut to Canada. he light-stations, light-vessels, and buoys of the district were vis- and inspected as often as practicable; and every station was ected at least three times. Fuel was supplied to those stations iring it during July and August, 1899, or May and June, 1900. stations were supplied with stores in May and June, 1900. The buoys were visited, examined, and filled, at least three times dur- the year. There are no day or unlighted beacons in the Tenth dis- t. In all cases the amount of coal used is stated in long tons.

he engineering work consisted in making repairs and improve- ts at various light-stations, the more extensive works being the uilding and enlarging of the keeper's dwelling at the Presque'ile rhead, Pennsylvania; rebuilding and increasing the height of the majuda rear range tower; building up the tops of the towers and ing the lanterns at Ogdensburg, Sacketts Harbor, and Fort Niag- , N. Y.; rebuilding the front tower, Niagara River range, New rk, and the installation of two water-tube boilers at Buffalo Break- ter, New York. Besides the many plans for smaller works, plans ve been designed for the Toledo Harbor light-station, Ohio.

LIGHT-STATIONS.

41. Ogdensburg, St. Lawrence River, New York.—The height of e tower has been increased 20 feet, and a 270° lens has been substi- ted for the 180° lens heretofore in use, to increase the area of visi- ity of light. The light can now be seen from all points of approach on the river.

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44. Cross Over Island, St. Lawrence River, New York.—Some 300 cubic yards of earth have been delivered and used in filling up depressions in light-house lot.

—. *Oak Point, St. Lawrence River, New York.*—The following recommendation, made in the Board's last four annual reports, is renewed:

Range lights are needed to guide vessels clear of the rocky shoals near the main channel of the river at Oak Point, between Ogdensburg light and Cross Over Island light. It is estimated that these can be established for $10,000, and it is recommended that an appropriation of this amount be made therefor.

49. Rock Island, St. Lawrence River, New York.—The woodshed has been removed and placed upon a new stone foundation near the boathouse. A platform has been built, and a walk connecting with the cement walk on the north side. The 1½-horsepower oil engine was installed with the necessary pipe connections for pumping water from the river. Various repairs were made.

—. *Chapman Shoal, St. Lawrence River, New York.*—The following recommendation, made in the Board's last four annual reports, is renewed:

This shoal is of solid rock, the top of which is awash at ordinary stages of water. It stands in mid-channel between Beckwith Island and North Colborne Island, and forms a dangerous obstruction. It is proposed to establish here a light and fog-signal station. It is estimated that this can be done for $25,000, and it is recommended that an appropriation of this amount be made therefor.

52. Carlton Island, St. Lawrence River, New York.—The lantern house at foot of mast from which the light is shown was rebuilt and enlarged. A well 60 feet deep has been drilled on the light-house lot and provided with a pump. Various repairs were made.

54. Tibbetts Point, St. Lawrence River, New York.—The characteristic of the fog-signal was changed from a 3-second blast with silent interval of 87 seconds, to a 3-second blast followed by alternate silent intervals of 17 and 37 seconds. The inlet channel through rock from the lake to excavated water reservoir for supplying fog-signal, was deepened.

The following recommendation made in the Board's last two annual reports is renewed:

The families of the two keepers are living in one small dwelling, much to the discomfort of both. A new dwelling for the assistant keeper is much needed. It is estimated that a proper structure could be built for not exceeding $3,500, and it is recommended that an appropriation of this amount be made therefor.

56. Sacketts Harbor, Lake Ontario, New York.—The tower was built 10 feet higher. The barn was rebuilt. The woodshed was moved back 20 feet, placed on a new foundation, and connected with the keeper's dwelling by a new walk. Sixty feet of boatways 5 feet wide were built. Various repairs were made.

57. Galloo Island, Lake Ontario, New York.—A circular reservoir 16 feet in diameter, with bottom in the rock 12 feet below ground surface, capacity about 236 barrels, was built near the fog-signal house to provide water.

59. Stony Point, Lake Ontario, New York.—Some 106 feet of lead suction pipe was laid connecting the well with the dwelling. Some 40½ rods of wire and rail fence was built along the southern half of the division line of light-house lot.

60. Oswego, Lake Ontario, New York.—A parapet 30 feet long was

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built with 10-inch timber, on the easterly side of pier abreast of the tower. An iron fence was built about the angular space between the watchroom and tower on its easterly side.

62, 63. Fair Haven, entrance to Little Sodus Bay, Lake Ontario, New York.—The boathouse, forced out of position by ice, was replaced on a new foundation backed with stone. A cement walk from the oil house to the main walk was built. Various repairs were made.

64, 65, 66. Big Sodus, at Sodus Bay, Lake Ontario, New York.—Some 440 feet of elevated walk were rebuilt on the west pier.

69. Braddock Point, Lake Ontario, New York.—Some 140 loads of earth were used to fill up low places about the building, and some grading and seeding was done. Some 720 square feet of brick walks were built. Various repairs were made.

73. Fort Niagara, Niagara River, Lake Ontario, New York.—The stone tower was built up with brick 11 feet and 4 inches, and the conveniences of a watch room were provided beneath the lantern.

The following recommendation made in the Board's last annual report is renewed:

The Niagara River is difficult to enter in bad weather and on dark nights. A small light at the mouth of the river where it empties into Lake Ontario would materially decrease the danger in making the port, and would increase the value of the Niagara River as a harbor of refuge. At present there is no refuge for vessels drawing more than 10 feet of water on the south shore of Lake Ontario between the Genesee River and Port Dalhousie except the Niagara River. It is estimated that a tower 25 feet high, located on United States land, showing a light covering the range of visibility needed by mariners, would cost about $2,000 to establish. The Board therefore recommends that an appropriation of $2,000 be made therefor.

74, 75. Niagara River range, Niagara River, New York.—The front beacon of this range was rebuilt in circular plan, painted white, and provided with a lens lantern. Various repairs were made.

78. Buffalo, main entrance to Buffalo Harbor, Lake Erie, New York.—The boathouse was rebuilt and moved to the south side of the south pier, about 150 feet west of the main light tower, where piles were driven and planked up for three sides of the foundation, the other side of the building resting upon the pier. The color of the light tower was changed from gray to white. Various repairs were made.

—. South Buffalo, main southern entrance of new breakwater, Buffalo Harbor, Lake Erie, New York.—By the act approved June 6, 1900, $45,000 was appropriated for establishing suitable light and fog-signal stations to mark the main southern entrance of the new breakwater at Buffalo, N. Y. Plans for the light towers and fog-signal house, including foundation and pile protection work were completed, and plans for the keeper's dwelling are being prepared.

79, 80. Dunkirk, Dunkirk Harbor, Lake Erie, New York.—An inclosed frame pierhead beacon was built on the pier erected last year. The open framework tower from which the light was shown since the destruction of the old tower in 1895 was transferred to the north pier, Erie Harbor, Pennsylvania, for use as a fog-bell tower. Repairs were made.

83, 84, 85, Presqu'ile Pierhead, Erie Harbor, entrance to Presqu'ile Bay, Lake Erie, Pennsylvania.—The keeper's dwelling was rebuilt and enlarged so as to accommodate the families of the two keepers. A pipe well was provided. The inner beacon (Erie No. 1) was raised

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by building an additional lower story. About 40 feet of elevated walk was built, and an independent foundation was provided for the boathouse. A telephone line connecting this station with the Presqu'ile North Shore light-station, and the Presqu'ile North Shore steam fog-signal station was built. Various repairs were made.

88, 89. Conneaut, entrance to Conneaut Harbor, Lake Erie, Ohio.—Two fifth order lenses were substituted for the sixth-order lens, and the arc of illumination of the front range light was increased. Various repairs were made.

—. Cleveland, on the hill at the east side of Cleveland Harbor, Ohio.—The old tower on the hill has been abandoned as a light-house. The dwelling attached to it is a substantial structure, but is insufficient in size for three keepers. The Board proposes to pull down the old tower, and, with the material and such other material as may be necessary, to build a small house on the lot and to put the present keepers' dwelling into good repair.

99, 100. Black River, entrance to Black River Harbor, Lake Erie, Ohio.—The rear range beacon was moved along the range line and placed on a new foundation 992 feet from the front beacon. A balcony with hand rail has been built around the base of the beacon lantern. Various repairs were made.

108, 109. Sandusky Bay, outer range, entrance to Sandusky Bay, Lake Erie, Ohio.—The channel over the outer bar having been improved, these lights were lighted on the opening of navigation, 1900, to form a range line to guide from the Cedar Point range line, through the Deep Hole and the improved channel, to the Sandusky Bay Inner Straight Channel Range line.

118. Port Clinton, entrance to Port Clinton Harbor, Lake Erie, Ohio.—The following recommendation, made in the Board's last annual report, is renewed:

The keeper's dwelling is unsightly, uncomfortable, and unhealthful. It is in bad repair and unfit for human habitation. It is estimated that a suitable dwelling can be built for $3,000, and the Board therefore recommends that an appropriation of this amount be made therefor.

119. West Sister Island, on West Sister Island, Lake Erie, Ohio.—New boatways have been built. A protection crib work was built to shield the landing place from the seas and the deposit of small stones and gravel in the vicinity. The boathouse was moved to the west side of the pier. A platform in front of boathouse and two concrete foundation piers were built. Some 300 feet of gravel walk were made from the dwelling to the barn. Various repairs were made.

121. Toledo Harbor, entrance to Straight Channel, Maumee Bay, Lake Erie, Ohio.—By the act of July 1, 1898, Congress appropriated $37,500 for a light and fog-signal station to mark the outer end of the main channel entrance to Toledo Harbor, and authorized a contract for its completion not to exceed $75,000. Bids for the construction of this station were opened on March 5, 1900. As the lowest bid was largely in excess of the amount contemplated for the work, all the bids were rejected. Congress, by the act approved June 6, 1900, authorized a contract for the work at a cost of $100,000. The Board therefore recommends that an appropriation of $62,500 be made for the completion of this work. Steps are being taken to obtain new bids for building the structures needed at this station.

123, 124. Maumee Bay Straight Channel ranges, Maumee Bay,

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Lake Erie, Ohio.—A metallic reservoir with mechanical appliances and lamp connection was made and installed in the outer beacon lantern, to furnish a continuous supply of oil sufficient to keep the light burning for three to five days, or for such times as the weather conditions in Maumee Bay may prevent the light-keeper from visiting the light. A walk about 64 feet long was built along the old row of piles from the outer or easterly beacon to the crib occupied by the oil house. Some 248 tons of stone were placed about the foundation of the tower. Minor repairs were made.

129. Detroit River, mouth of Detroit River, Lake Erie, Michigan.—By act approved June 6, 1900, $1,000 was appropriated to purchase a site and erect a boathouse on the mainland for the use of the light-keepers. Steps are being taken toward securing a site for the structure. Various repairs were made.

136, 137. Grosse Isle (north channel) range, Detroit River, Michigan.—The following recommendation, made in the Board's last six annual reports, is renewed:

The site was paid for and the beacons were completed, but funds have not permitted the erection of a dwelling. The beacons are situated near the north end of the island, where the houses are almost exclusively owned and occupied by summer residents, and there is no place where a keeper can live within a reasonable distance. The construction of a dwelling is therefore essential to the proper maintenance of the lights. A suitable dwelling may be constructed for $3,500, and an appropriation of that amount is recommended for that purpose.

138, 139. Grosse Isle (south channel) range, Detroit River, Michigan.—The following recommendations, made in the Board's last seven annual reports, is renewed:

A new dwelling is needed for the keeper of this range. He is now living in a dwelling on Mamajuda, which is not only unsuitable for the purpose, but is too far away. It is deemed dangerous for the keeper to live on the side of the channel opposite to the lights. A proper dwelling can be built on a foundation partially in the water for not exceeding $5,000, and it is recommended that this amount be appropriated for that purpose.

140, 141. Mamajuda range, Detroit River, Michigan.—The pile-landing wharf was rebuilt. The rear tower was rebuilt, circular plan, and increased in height 12 feet. Various repairs were made.

142, 143. Grassy Island, south channel range, Detroit River, Michigan.—The rear light-tower was built up 10 feet higher. The slopes of the embankment between beacons were riprapped with about 10 cords of stone. Minor repairs were made.

144, 145. Grassy Island, north channel range, Detroit River, Michigan.—The slopes of the embankment between and about the beacons were riprapped with about 100 cords of stone. The sheet piling under the boathouse and front side of wharf were battened where necessary to retain the earth filling. The old boat slip was filled up with earth and overlaid with a floor inside of the boathouse, and 6 feet outside, with an inclined platform provided with oak rollers for taking in the keeper's boat.

146, 147. Ecorse range, Detroit River, Michigan.—About 15 tons of stone were placed upon the embankment between the range beacons to form a revetment to prevent the washing away of the earth.

The following recommendation made in the Board's last five annual reports is renewed:

The lights of this range are located on the flats, in water about 3½ feet deep, in front of a wide marsh. The nearest place where a keeper could reside is in the

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village of Ecorse, about three-fourths of a mile distant in a direct line. If he should live there, it would be necessary to row fully a mile. This would be quite difficult at times, as the ice forms and remains in the shallow water while the main channel is open. The light-house reservation, which is 100 feet wide and about 700 feet long, is entirely submerged, and the bottom is so soft that a secure foundation can be had only upon piles protected with riprap stone. It is indispensable to the proper care of this station that the keeper live on its site. This can be made possible only by the erection here of a keeper's dwelling. It is estimated that a suitable one can be erected for $5,000, and it is recommended that an appropriation of this amount be made therefor.

REPAIRS.

Repairs more or less extensive were made at the following-named light-stations:

61. Oswego Breakwater, N. Y.
63. Fairhaven, N. Y.
67, 68. Genesee, N. Y.
70. Oak Orchard, N. Y.
71. Thirty-Mile Point, N. Y.
77. Buffalo Breakwater, N. Y.
81. Presqu'ile Fog-Signal Station, Pa.
87. Presqu'ile, Pa.
90, 91. Ashtabula, Ohio.
92. Fairport, Ohio.
95. Cleveland, East Breakwater, Ohio.
96. Cleveland, West Breakwater, east end, Ohio.
97. Cleveland, East Pier, Ohio.
98. Cleveland, West Pier, Ohio.
101. Vermilion, Ohio.
102. Huron, Lake Erie, Ohio.
104, 105. Cedar Point, Ohio.
106, 107. Sandusky Bay, inner range, Ohio.
111. Marblehead, Ohio.
114. South Bass Island, Ohio.
115. Green Island, Ohio.
116. Port Clinton, Ohio.
126, 127. Manhattan range, Ohio.
128. Monroe, Lake Erie, Mich.
138, 139. Grosse Isle, South Channel range, Mich.

LIGHT-VESSELS.

130. Bar Point Shoal light-vessel, No. 59, mouth of Detroit River, Michigan.—This wooden light-vessel, which was built in 1893, is of about 101 net tons burden and has a steam fog-signal. She used 174 gallons of oil and 4 tons of coal. She was removed from her station December 11, 1899, at the close of navigation and laid up for the winter at the light-house depot at Detroit, Mich. She was replaced on her station at the opening of navigation in the spring on April 10, 1900. Slight repairs were made, including a new smokestack. The vessel is in very good condition, both as to cleanliness and repairs.

131. Limekiln Crossing (south) light-vessel, No. 64, Detroit River, Michigan.—This wooden scow used as a light-vessel was built in 1893, is of about 16 tons net burden, and has a bell, struck by hand, for a fog-signal. There were used on her 46 gallons of oil and 2 tons of coal. She was removed from her station on December 13, 1899, at the close of navigation, and laid up for winter at the light-house depot at Detroit, Mich., and replaced on her station at the opening of navigation in the spring on April 10, 1900. She was run into and damaged by a passing vessel, the schooner *Three Brothers*, on November 23, 1899. The damages caused by this collision were repaired during the winter while she was laid up at Detroit and the cost of repairs paid by the owner of the vessel. She is in excellent condition as to neatness and cleanliness.

132. Limekiln Crossing (north) light-vessel, No. 65, Detroit River, Michigan.—This wooden scow, used as a light-vessel, was built in 1893, is of about 16 tons net burden, and has a bell, struck by hand, as a fog-signal. There were used on her 31 gallons of oil and 2 tons

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of coal. She was removed from her station on December 13, 1899, at the close of navigation, laid up for the winter at the light-house depot at Detroit, Mich., and was replaced on her station at the opening of navigation in the spring on April 10, 1900. She was run into and dragged about 25 feet from her proper position on June 20, 1900, by the barge *St. Joseph*, when several awning stanchions were bent, but no serious injuries were sustained. She is in excellent condition as to cleanliness.

—. *Relief light-vessel No. 63.*—This wooden scow, built in 1893, is of about 16 tons net burden. She is in fairly good condition, but will need some repairs during the coming year. It is proposed to make these repairs during the winter when the other light-vessels, and also the light-house tender *Haze*, are laid up at Detroit. About 46 gallons of oil and 2 tons of coal were used. This vessel was in position in Detroit River as Ballard Reef light-vessel, No. 63 until the close of navigation, when she was removed from her station on December 13, 1899, and laid up at the light-house depot at Detroit, Mich. On February 28, 1900, she was discontinued and laid up at Detroit ready for use as a relief light-vessel in the Detroit River in case either of the small light-vessels there is disabled. She is now at Detroit with a shipkeeper on board ready for service.

FOG-SIGNALS OPERATED BY STEAM OR HOT AIR.

54. Tibbetts Point, St. Lawrence River, New York.—This 10-inch steam whistle, in duplicate, was in operation some 257 hours during the year, and consumed about 9 tons of coal. The characteristic of this fog-signal was changed on the opening of navigation, March, 1900, from blasts of 3 seconds' duration, followed by silent intervals of 84 seconds, to blasts of 3 seconds' duration, followed by alternate silent intervals of 17 and 37 seconds.

57. Galloo Island, Lake Ontario, New York.—This 10-inch steam whistle, in duplicate, was in operation some 229 hours during the year, and consumed about 17 tons of coal.

67. Genesee range (front), Lake Ontario, New York.—This 6-inch steam whistle was in operation some 213 hours during the year and consumed about 7 tons of coal.

77. Buffalo Breakwater (north end), Lake Erie, New York.—This 10-inch steam whistle was in operation some 604 hours during the year, and consumed about 33 tons of coal. It was temporarily discontinued on June 20, 1900, for the installation of new duplicate water tube boilers in place of the single locomotive boiler heretofore in use.

81. Presqu'ile, Presqu'ile Peninsula, Lake Erie, Pennsylvania.—This 10-inch steam whistle, in duplicate, sounding blasts of 5 seconds, duration followed by silent intervals of 25 seconds, was established August, 1899, and since that date was in operation some 101 hours and consumed about 6 tons of coal. It is connected by telephone with the light-stations at Presqu'ile and Presqu'ile Pierhead, and is in charge of the keepers at the latter station.

90. Ashtabula range (front), Lake Erie, Ohio.—This 10-inch steam whistle was in operation some 220 hours during the year, and consumed about 15 tons of coal.

96. Cleveland West Breakwater (east end), Lake Erie, Ohio.—This 10-inch steam whistle, in duplicate, was in operation some 913 hours during the year, and consumed about 44 tons of coal.

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129. Detroit River, Lake Erie, Michigan.—This 10-inch steam whistle, in duplicate, was in operation some 109 hours during the year, and consumed about 12 tons of coal.

130. Bar Point Shoal light-vessel, No. 59, Lake Erie, Michigan.—This 6-inch steam whistle was in operation some 99 hours during the year and consumed about 6 tons of coal.

FOG-SIGNALS OPERATED BY CLOCKWORK.

Fog-bells operated by clockwork are in use at these stations: Oswego Breakwater; Fair Haven range, front; Genesee range, front; and Buffalo Breakwater, north end, New York; at Presqu'ile Pierhead, Pennsylvania; and at Cleveland West Breakwater, east end, Ohio. They are all in good condition. The one at Presqu'ile Pierhead was removed from the lower part of the Presqu'ile Pierhead light-house tower and placed in a special open framework structure near the end of the eastern extension of the north pier. At Genesee range, front, Buffalo Breakwater, north end, and Cleveland West Breakwater, east end, these fog-bells are used only when the use of the steam whistles is temporarily discontinued, or when a fog comes on unexpectedly, until steam can be raised in the fog-signal boilers.

A bell is struck by hand on the Bar Point Shoal light-vessel No. 59 when the steam fog-whistle is temporarily discontinued.

A bell is also struck by hand during fog on the two Limekiln Crossing light-vessels in the Detroit River.

BUOYAGE.

The important changes in the buoyage of the district since June 30, 1899, are the substitution of 3 gas buoys for others; the establishment of 6 spar buoys to mark the recently dredged channel in the Niagara River above Cayuga Island; the placing of 3 new spar buoys in the Tonawanda and Main channels of the Niagara River; a new can buoy to mark the western edge of Kelleys Island Shoal, Lake Erie, and additional spar buoys in the channels into Sandusky and Maumee bays, Lake Erie.

There are now 23 gas buoys in the district, and while there are several other points where these aids to navigation are desired, it will not be necessary to materially increase their number for several years to come. The tender *Haze* can not properly care for more than about 25 gas buoys in addition to her other work, though the addition of 8 small gas tanks, holding in all 2,128 cubic feet of gas of 14 atmospheres, to the *Haze's* storage capacity renders the work of supplying the gas buoys of the district somewhat easier than last year. The gas for the lighted buoys in Lake Erie is procured at Detroit, and they are filled from the tanks on the *Haze*. Gas for the St. Lawrence River and Lake Ontario lighted buoys is procured at Syracuse, N. Y., and shipped to Cape Vincent in two large tanks or storeholders. This is a somewhat expensive method of obtaining the gas, but it is nevertheless the most economical method available at present, as the total cost of the gas used, including freight charges on the storeholders to Syracuse and return three times a year, is less than what it would cost to operate a gas plant by the Light-House Board at some point in the St. Lawrence River.

All the buoys in Lake Erie and part of those in the Niagara River are cared for by the tender *Haze*. The buoys in Lake Ontario and

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the St. Lawrence River and part of those in the Niagara River are cared for by contract. The contract work in the St. Lawrence River has been well done and that in the Niagara River fairly well. The contractor for the buoy work in the St. Lawrence River was accidentally killed by the breaking of a spar on December 17, 1899, while he was taking up a gas buoy for the winter. His administrators employed another buoy contractor to carry on the work, so that the Government sustained no loss. The caring for buoys by contract is not entirely satisfactory, but the one tender can not do all the buoy work of the district.

The general condition of the buoyage of the district is very good. Comparatively few buoys have been found adrift or displaced during the year. Spar buoys are occasionally broken off or cut adrift, and the gas buoys are sometimes dragged out of place or injured by passing vessels. In only one instance has the master of the vessel doing the injury reported the fact to the light-house inspector. In many cases it is impossible to ascertain the name of the culpable vessel. There is no law in the State of Ohio for the protection of aids to navigation established by the Light-House Board.

Several of the gas-buoy lamps were sent to New York for repairs. In some instances the lamps appear to have been injured by the shock due to the buoys being struck by passing vessels, although the buoy itself was uninjured. In other cases no reason was evident why the lamps failed.

The supply of spare buoys, sinkers, etc., now on hand, together with a few more spar buoys and sinkers, will be sufficient to answer the wants of the district for the year ending June, 1901.

DEPOTS.

Rock Island, St. Lawrence River, New York.—This important buoy depot, the only one in the St. Lawrence River and Lake Ontario part of the district, is now in good condition.

Buffalo, Lake Erie, New York.—The work of repairing and enlarging the light-house depot at Buffalo, for which an appropriation of $50,000 was made by the act approved March 3, 1899, has been begun, and is now in progress under two contracts—one for removing and rebuilding the timber harbor walls along the Buffalo River front and around slip and enlarging and deepening the slip, the other for building the foundations, storehouses, sheds, tramroad tracks, retaining walls, floors and pavements, water-drainage systems, and inclosing fence. The entire work is to be completed during the present season.

Erie (Presqu'ile Pierhead) Lake Erie, Pennsylvania.—The buoy shed was leveled and placed on twelve new timber abutments resting on large stone at the bottom. It is in fair condition.

Sandusky Bay (Cedar Point), Lake Erie, Ohio.—Piles at the two outer corners and 14 fender piles along side of wharf were driven and bolted to the stringers.

Maumee Bay, Lake Erie, Ohio.—The buoy shed is old, but in fair repair.

TENDERS.

Haze.—This wooden screw steamer was built in 1876, is of about 316 tons gross burden, and is the only tender in the district. She is used as a supply vessel and buoy tender and also to carry the inspector

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on his quarterly visits to the light-stations. She was extensively repaired in 1895–96, and has had additional necessary repairs to deck and sides each year since then. She was docked last in May, 1900, when such additional work as was found necessary on the part of the hull under water was completed. Her boilers are in good condition, considering their age, which is nearly 24 years. Eight additional small gas tanks were placed in her hold in March, 1900, thus increasing the gas-carrying capacity from 5,264 to 7,392 cubic feet. This will enable the *Haze* to care for the gas buoys of the district better than heretofore. Considering that she is 24 years old, the *Haze* is in very fair condition, and by constant annual repairs can be kept in commission for several years if necessary, but she is entirely too small to carry all the supplies for the district. She has not the suitable quarters and conveniences for the inspector, officers, and crew, and can last but a few years longer at best. The work of the district has increased so much of late years, especially in the direction of an increased number of gas buoys, requiring frequent attention, that it is with great difficulty that it can be accomplished by the *Haze* alone. There is considerable work required in the matter of verifying bearings and positions of buoys, light-stations, and shoals, rewriting sailing directions, etc., which can not be done, owing to the large amount of other work on hand for the tender which must not be neglected. The *Haze* was laid up in winter quarters at Detroit, Mich., December 21, 1899, and resumed work March 15, 1900. She steamed some 5,767 miles during the year and consumed about 276 tons of coal.

Tender for the Tenth light-house district.—The following is a recommendation which was made in the Board's last three annual reports:

A new modern vessel is greatly needed in this district. The *Haze* is not only too old to be of much further service, but she is not large enough to do the increased and still further increasing work of the district. It is estimated that a proper tender can be built for not exceeding $85,000, and it is recommended that an appropriation of this amount be made therefor.

In view of the present high prices demanded for labor and material it is evident that a vessel of the size and character needed can not be built for this sum. The Board finds, however, that such a vessel can be built for not exceeding $120,000, and it recommends that an appropriation of this amount be made therefor.

Warrington.—This wooden steam-screw barge was built in 1868, and is of 257 tons gross burden. Excepting between November 26, 1899, to May 1, 1900, when she was laid up for the winter, she was engaged in making the usual periodical inspections of light and fog-signal stations, and transporting and handling materials entering into the work of repairs and improvements throughout the district. She steamed some 6,698 miles and consumed about 541.58 tons of coal. She was painted outside and inside.

ELEVENTH DISTRICT.

is district extends from the mouth of the River Rouge, Detroit r, Michigan, to the westerly end of Lake Superior. It embraces ds to navigation on the United States shores and waters of Lakes lair, Huron, and Superior, the upper part of the Detroit River, the lair and St. Marys rivers, and that part of the Straits of Mackiying to the eastward of a line drawn across the straits just to the ard of Old Mackinac Point light-station, Michigan.

spector.—Commander Duncan Kennedy, United States Navy, to lary 11, 1900; since then Commander J. C. Wilson, United States y.

ngineer.—Maj. Thomas H. Handbury, Corps of Engineers, United es Army.

here are in the district—

t-houses and beacon lights, including 17 post lights	220
t-vessels in position	3
or unlighted beacons	1
ignals operated by steam	31
ignals operated by clockwork	5
lighted buoys in position	22
buoys in position	3
r buoys in position	377
mer *Marigold*, buoy tender, and for supply and inspection	1
mer *Amaranth*, for construction and repair	1
m launch *Lotus*, for construction and repair	1

LIGHT-STATIONS.

52, 153. Isle aux Pêches range, Lake St. Clair, Twenty-foot Chan-, Michigan.—The structure from which the front light is shown carried away by a tug on July 27, 1899, and was reestablished on gust 4, 1899, at the expense of the owners of the tug. This struce was again carried away on September 17, 1899, and was reestabhed on October 3, 1899, on its old line, but about 500 feet nearer rear light, at the cost of the United States, as it was impracticable obtain the necessary data for fixing the responsibility for this acciit. Both structures of the range were again carried away by ice in e spring of 1900, and were reestablished on April 28, 1900. The iving of the piles was completed on April 27, 1900. The upper odwork of the beacons, consisting of platform, targets, and masts, ere constructed, framed, and painted at the Detroit light-house pot, and on April 28 were placed in position. The lantern carriages ere also fitted and hung. Each beacon consists of a hexagonal clusr of six piles, 40 feet long, driven 3 feet to centers, the front luster being driven in about 19 feet of water and the rear cluster in bout 8 feet. The focal plane of the front light is 18 feet above lake vel, and the rear light 38 feet. The fact that the piles on which ese two lights stand are always carried away by ice in the winter, nd during the summer are once or twice run down by passing vessels, hows the need for structures of some strength and permanence which will serve as day beacons for the range and from which lights can be exhibited at night. The present arrangement has proven to be inade-

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quate, as the light is not visible at times when it should be under reasonable atmospheric conditions. Something larger and more substantial is required.

The rear beacon should be placed as near the national boundary line as practicable. It should be a skeleton tower about 72 feet high, made of angle iron, resting upon a crib filled with stone and concrete for a foundation. This will be about 20 feet square, standing in from 8 to 10 feet of water. A suitable disk should be attached for a day beacon and a strong lens-lantern light should be exhibited from it at night.

The front beacon should be placed about a mile in front of the rear beacon, both being in the line of the axis of the dredged Twenty-foot Lake St. Clair Channel. It will thus stand in from 18 to 20 feet of water. A suitable riprap foundation, with its top about 5 feet above the bottom of the lake, should first be prepared. Upon this a crib 36 feet square should be built and carried up to a height of about 7 feet above the surface of the water. This should be filled with stone, and it should be plated with iron in the vicinity of the water line. On the top of this should be built a suitable keeper's dwelling, surmounted with a tower from which to exhibit a fourth order light. It is estimated that this can be done at a cost not exceeding $12,000, and the Board recommends that an appropriation of this amount be made therefor.

154, 161. Lake St. Clair Twenty-foot Channel, Michigan.—Two additional ladders were placed on each of the four cribs. Eight mooring cleats were placed to facilitate the landing of the tenders at the cribs.

179. Upper No. 12, St. Clair River, Michigan.—The foundation crib was damaged by a vessel striking it. As a protection to the crib, three 12-inch oak piles, 34 feet long, were driven 15 feet into the bottom of the river, placed in a straight line 6 feet apart from center to center. On April 16, 1900, the top of the crib was carried away by ice. The light is shown from the old tripod structure.

183. Fort Gratiot, Lake Huron, Michigan.—Material for a new fog-signal building, new boilers and machinery, and for necessary repairs to the tower was purchased and delivered at the station. Building operations on the new fog-signal structure were commenced in the early part of May, and at the close of the year much of the work had been done. The fence in front of the tower and dwelling was rebuilt, and slight repairs were made to the illuminating apparatus. A survey of the reservation was made and the work platted.

186. Sand Beach, harbor of refuge, east entrance, north (main) light, Lake Huron, Michigan.—The color of the tower was changed from brown to white. A wrought-iron lantern railing was delivered at the station. The keeper was furnished with a pipe vise, pipe cutter, and flue cleaner, to enable him to make repairs to the fog-signal apparatus.

191. Port Austin Reef, Lake Huron, Michigan.—The material for rebuilding the light tower and reconstructing the fog-signal houses into one building was purchased and delivered at the station. At the close of the year the brick buildings were practically finished and the duplicate fog-signal plant was ready for service. The top of the foundation pier where the old fog-signal buildings and light tower stood was paved with brick, and the small hoisting engine was removed and reset in its new position on the south side of the pier. The land-

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ing crib south of the pier was rebuilt, a boat crane was set, and a stairway was built. A flagstaff was erected near the dwelling and 22 loads of clay and gravel were spread around the site. The lens was transferred from the old frame tower to the new brick structure, from whence it was exhibited on the opening of navigation. Various repairs were made.

194. Charity Island, Lake Huron, Michigan.—The metal work for a brick oil house and the material for repair to the boat landing and keeper's dwelling were conveyed to the station. Minor repairs were made.

195. Tawas, Lake Huron, Michigan.—The brick fog-signal building and a duplicate steam fog-signal apparatus were completed, and the 10-inch steam whistle was made ready for operation. A well was sunk. A cribbing of logs was placed around the building and the grounds in the vicinity of the structure were graded. Telephone posts, to make connection between the dwelling and fog-signal house, were placed. A board walk was laid from the light tower to the signal, and a landing wharf, consisting of cribs filled with ballast stone, with board walk and tramway, was constructed 1,200 feet westward of the fog-signal house. The material to establish a telephone system between the fog-signal building and the keeper's dwelling was delivered.

Now that a fog-signal is established at this point, and an assistant keeper is needed for its care and operation, a dwelling for his use is a necessity. It is estimated that such a dwelling, with a small barn and other necessary outhouses, can be built for $5,000. The Board therefore recommends that an appropriation of this amount be made therefor.

199. Thunder Bay Island, Lake Huron, Michigan.—Material for repairs to the assistant keeper's dwelling was delivered at the station. A worn-out governor for signal No. 1 was replaced.

—. *Middle Island, Lake Huron, Michigan.*—The following recommendation, made in the Board's last four annual reports, is renewed:

A light and fog-signal are now needed here, both in order to make available the harbor of refuge behind Middle Island, the only one in the vicinity having sufficient depth of water for the modern deep-draft lake vessels, and to mark a turning point in the regular course of vessels bound up or down the coast. It is proposed to establish a light and fog-signal station on Middle Island. This it is estimated can be done for $25,000, and it is recommended that an appropriation of this amount be made therefor.

202. Presque Isle, Lake Huron, Michigan.—The tramway was rebuilt, 410 ties being renewed, the entire track was relaid, and the walk between the rails was repaired. Various repairs were made.

203. Forty Mile Point, Lake Huron, Michigan.—The work of rebuilding the tramway leading from shore and over gap to the boat landing was completed in November, 1899. The posts formerly supporting the tramway over the gap were replaced with cribs, five of which were 8 feet square and one 8 feet by 12 feet, and were placed 16 feet apart and filled with ballast stone. The cribs were connected by 10-inch stringers, which were laid the entire distance of the tramway, and upon which the track and walk were placed. A retaining wall of logs was built in the bank 4 feet in the rear of the boathouse to keep the sand away from the building.

204. Spectacle Reef, Lake Huron, Michigan.—The material for

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repairing the protection pier to the light tower was delivered. The opening between the bottom timber of pocket No. 2 was closed by placing timbers on the inside face of the pocket in a vertical position and bolting them with three 1-inch bolts running through the entire outer wall of the crib. The upper bolt is placed about 1 foot from the top of the timber, the lower bolt about 2 feet below the water surface, and the remaining one halfway between the top and bottom bolts. Two steel protection plates were fastened to the east side of the crib, the loose and insecure bolts in the iron casing were replaced with larger ones, all projecting bolts were driven in, and all defective plank in the deck of the crib were renewed. Some 36 cords of stone were used in refilling pocket No. 2; also the pockets on the southwest side of the pier that were partly empty. A new double door was constructed in the fog-signal building and provided with a barricade as a protection against the waves and ice, and the window, formerly in the east end of the structure, was moved to one side. A new iron smokestack to replace the worn-out stack of fog-signal No. 1 was delivered. Various repairs were made.

209. Cheboygan, Lake Huron, Michigan.—A brick smokestack, 40 feet high, was built for the fog-signal boilers, replacing the iron stacks formerly in use. The boathouse was raised and repaired. A small landing crib with boatways was built. The illuminating apparatus was repaired. Repairs were made.

211, 212. Cheboygan River Range, Straits of Mackinac, Michigan.—The work of constructing an iron beacon to replace the skeleton timber tower of the rear range was in progress at the close of the year. The act approved July 1, 1898, provided $1,750 for the purchase of additional land for the front range. The question of its ownership is now pending in court. Various repairs were made.

220. Mud Lake, St. Marys River, Michigan.—The act approved July 1, 1898, provided $3,500 for establishing a light to mark the turning point in the channel through Mud Lake, St. Marys River, Michigan. At the close of the last fiscal year the construction of the foundation crib for carrying a Pintsch gas light for marking this point was built to the seventh course, from which point the work was completed in July, 1899. The crib is 26 feet square, filled with stone. It is in 21 feet of water, and rests upon a foundation of stone thrown in until the top surface is about 14 feet below the surface of the water. There is a berm of 4 feet around the outside edge of the crib. The crib is surmounted by a frustum of a pyramid 8 feet high. In this portion there are placed two wrought-iron cylinders, each 50 feet in diameter and 8¼ feet long, having a capacity of 100 cubic feet. When these are filled with Pintsch gas at a pressure of 12 atmospheres the quantity is sufficient to keep the light burning 2,400 hours, or about 3 months, the consumption being at the rate of a cubic foot an hour. The light is a white flash for 5 seconds, with an eclipse of 10 seconds, and is exhibited from the top of a 4½-inch iron pipe 27 feet above the surface of the water. The light was first shown on August 15, 1899. During July 181 cords of stone were deposited on the site, 77 cords of which were placed in the crib. There were in all some 309 cords of stone delivered here, 232 cords of which were deposited for foundation and riprap and 77 cords for crib filling.

245, 246. Stations 10 and 11, Hay Lake Channel, St. Marys River, Michigan.—The material for making additions to the boat landing

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and completing the walk between the ranges was delivered at the station. The walk between the dwelling and range lights was completed by laying 2,665 running feet of walk. Fourteen boat rollers were provided for the boathouse; 60 feet of ways were built; 35 slats of the windmill wheel were renewed; the wheel was painted. Various repairs were made.

248. East Side Middle No. 12, Hay Lake Channel, St. Marys River, Michigan.—The crib was carried away by the ice in the spring of 1900. Soundings were taken near the foundation crib to ascertain the advisability of making needed repairs.

262. North entrance, No. 27, Hay Lake Channel, St. Marys River, Michigan.—The metal work for a brick oil house was completed. Various repairs were made.

265, 266. Vidal Shoals Channel Range, St. Marys River, Michigan.—The rebuilding the north and south pier lights at their new positions was completed on September 16, 1899. Three concrete piers for the foundation of the rear range tower and a brick foundation for the front range tower were built, and the towers were placed in their respective positions and painted. A stairway was built leading from the foot of the rear range to the top of the railroad embankment. Various repairs were made.

271. Brush Point Beacon, St. Marys River, Michigan.—The metal work for the beacon was delivered at St. Marys River lower range light-station. It will be erected soon.

276, 277. Head of St Marys River Range, Michigan.—The act approved July 1, 1898, provided $1,000 for establishing an additional set of range lights to mark the channel at the entrance to St. Marys River. This amount being found insufficient for the erection of proper beacons and a suitable dwelling for the keeper, recommendation was made that an additional appropriation of $2,700 be secured for this work. The act approved June 6, 1900, provided the additional sum required. Surveys of the sites needed for the erection of the above-named structures were made, and maps and tracings prepared showing the locations on which the beacons should be erected. Title to the site for the front beacon was obtained. Condemnation proceedings to secure the land needed for the site for the rear beacon were instituted. Five granite monuments for marking the corners of the sites were purchased and delivered at the Detroit depot.

288. Lower Lake George, St. Marys River, Michigan.—Soundings in the vicinity of the foundation crib were taken and the height of the corners of the crib above water level was obtained. The crib is to be rebuilt soon.

290. Upper Lake George, St. Marys River, Michigan.—Soundings in the vicinity of the foundation crib were taken and the height of the corners of the crib above water level was obtained. The crib is to be rebuilt soon.

306. Point Iroquois, Lake Superior, Michigan.—The material for replacing the sheet-iron smokestacks by a brick chimney and making other repairs was delivered to the station. The old sheet-iron smokestacks were taken down, a brick chimney 40 feet high was built, and both boilers connected. A set of tubes was provided for each boiler. The old barn was replaced with a wooden structure. A well was provided and curbed with brick. Various repairs were made.

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—. *Crisps Point, Lake Superior, Michigan.*—The following recommendation, made in the Board's last four annual reports, is renewed:

This is a dangerous point for vessels bound down the lake in thick weather. These vessels all try to make Whitefish Point, but a slight variation in their course from the nearest point of departure will run them ashore near Crisps Point. Several wrecks have occurred here. It is proposed to establish a light and fog-signal station on or near Crisps Point. This it is estimated can be done for $18,000, and it is recommended that an appropriation of this amount be made therefor.

312. Grand Island Harbor, Michigan.—The crib work for protection against the sea was completed in December, 1899. Some 262 running feet of cribwork was constructed. The cribbing is 8 feet over all, 3 longitudinal courses high, bolted with 30-inch driftbolts, and filled with ballast stone. About 25 running feet of the cribwork to the westward of the dwelling was rebuilt; also one of the cribs to the eastward. About 16½ cords of stone filling were used in the new work. Minor repairs were made.

315. Marquette, Lake Superior, Michigan.—A new iron smokestack was erected on fog-signal building No. 1. Various repairs were made.

316. Marquette Breakwater, Michigan.—The work of lighting this beacon, on the south end of the breakwater, with electricity was completed, the electrical connections made with the city wires, and the light was shown for the first time on July 11, 1899.

320. Stannard Rock, Lake Superior, Michigan.—The south fog-signal boiler and engine were replaced with a newly repaired plant, and a new iron smokestack was provided. A 10-inch globe ventilator for the tower smoke pipe, a smokestack, and some pier railing stanchions were delivered at the station. Various repairs were made.

—. *Portage River Pierhead, Michigan.*—Material for a structure at the outer end of the pier from which to exhibit a temporary lantern light was delivered at the station and the structure was erected in June. It is a wooden mast with frame sills and diagonal braces, painted white, and is provided with an iron lantern bracket, lamp hoist, and guys.

323, 324. Portage Range, Michigan.—The keeper's dwelling rear beacon, which had been damaged by lightning on July 26, 1899, was repaired. The material for rebuilding the front beacon, repairing the crib-work protection to the dwelling, providing a lightning conductor, rebuilding the boathouse, etc., was delivered at the station. The front beacon was nearly completed. The beacon is square in plan, octagonal above, and is located on a crib. It is sheathed with flooring on the exterior, ceiled with beaded ceiling, and is provided with hardwood floors and stairway. The roof of the structure is octagon in plan, is sheathed with boards, covered with iron, and is provided with copper ventilator, cowl, four side ventilators, and a lightning conductor. At the rear beacon the boathouse was rebuilt. Two decayed courses of the crib work which protects the dwelling were removed. The work of renewing them and the deck is in progress. A pipe was driven to a depth of 57 feet, and a pump was attached to the pipe to provide the station with water.

325, 345. Portage River and Lake lights, Michigan.—Material for rearranging these lights, for making repairs to the dwellings at Princess Point and Rouleau Point, and establishing three additional pile clusters between Atlantic Point and Rouleau Point Range was delivered at this station. The piles for range light No. 5 were driven and

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the upper timber work is about finished. The piles for range lights Nos. 9 and 12 were driven. Various repairs were made.

349. Manitou, Lake Superior, Michigan.—Material for rebuilding the landing crib and providing a derrick and hoisting engine was delivered at the station.

357. Eagle River, Lake Superior, Michigan.—The following statement and recommendation was made in the Board's annual reports for 1894, 1896, 1897, 1898, and 1899:

The moving of this light to Sand Hills, at a cost not to exceed $20,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. Recommendation is made that the amount named be appropriated.

It is now estimated that $25,000 will be required for this work, and it is recommended that an appropriation of that amount be made therefor.

362. Ontonagon Pierhead, Lake Superior, Michigan.—On December 12, 1899, the open framework tower at the outer end of the west pier was carried away during a severe storm. The construction of an iron beacon is well advanced. A temporary wooden structure, consisting of a square house, painted brown, with a square lantern, was erected on the site of the tower that was carried away, for the exhibition of a temporary fixed red lantern light. The temporary light was shown on the night of April 16, 1900. The material required for rebuilding the elevated walk and constructing a watch room in the new iron beacon was purchased and delivered at the Detroit light-house depot.

363. Outer Island, Lake Superior, Wisconsin.—Material for building the fog-signal houses into one building, providing new fog-signal boilers, changing machinery, rebuilding the tramway, renewing defective timbers and decking of the landing wharf, providing screens and storm doors for dwelling, and making other minor repairs was delivered at the station. Minor repairs were made.

372, 387. Superior and St. Louis Bays, Wisconsin and Minnesota.—The fourteen pile clusters that were carried away by the ice were replaced.

—. *Duluth-Superior Harbor, Minnesota and Wisconsin.*—The work of driving the piles for six additional post lights to be established in this harbor to complete the system for lighting these channels was completed at the close of the year.

—. *Rock of Ages, Lake Superior, Michigan.*—The following recommendation has been made in the Board's last four annual reports:

During the season of southerly and westerly winds many vessels bound to and from Duluth, by taking a course along the north shore of the lake and in lee of Isle Royale, are enabled to run when the lake is too rough for the more southerly course. A light and fog-signal on the dangerous rocks off the westerly end of Isle Royale would be a valuable aid to these vessels. It is therefore proposed to establish a light and fog-signal station on the Rock of Ages, off the western end of Isle Royale. This, it is estimated, can be done for $50,000, and it is recommended that an appropriation of that amount be made therefor.

It is now estimated that it will cost $125,000 to establish this light and fog-signal, and the Board recommends that an appropriation of this amount be made therefor.

This estimate and recommendation is in accordance with that made by the Secretary of the Treasury in his letter of January 4, 1900, to the chairman of the House Committee on Appropriations.

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REPAIRS.

Repairs, more or less extensive, were made at the following-named stations:

148. Belle Isle, Mich.
165. St. Clair Flats Canal, upper, Mich.
166, 167. St. Clair Flats Range, Mich.
190. Pointe aux Barques, Mich.
192, 193. Saginaw River Range, Mich.
197. Sturgeon Point, Mich.
200, 201. Presque Isle Harbor Range, Mich.
206. Detour, Mich.
208. Bois Blanc, Mich.
210. Cheboygan Crib, Mich.
213. Round Island, Mich.
218, 219. Pilot Island Range, Mich.
221, 222. Winter Point Range, Mich.
237. North Side, lower No. 2, Hay Lake Channel, Mich.
239. North Side, middle No. 4, Hay Lake Channel, Mich.
241. North Side, upper No. 6, Hay Lake Channel, Mich.
242. Front No. 7, Hay Lake Channel, Mich.
243. Rear No. 9, Hay Lake Channel, Mich.
258. West Side, lower No. 23, Hay Lake Channel, Mich.
259. East Side, lower No. 24, Hay Lake Channel, Mich.
267. St. Marys Falls Canal, South Pier, Mich.
289. Middle Lake George, Mich.
304, 305. Sault Range, Mich.
310. Big Sable, Mich.
317. Granite Island, Mich.
318. Big Bay Point, Mich.
319. Huron Island, Mich.
354. Eagle Harbor, Mich.
355, 356. Eagle Harbor Range, Mich.
388, 389. Duluth Range, Minn.
394. Passage Island, Mich.

LIGHT-VESSELS.

162. Grossepoint light-vessel No. 10, upper end of Twenty-Foot Channel, Lake St. Clair, Michigan.—This wooden vessel, of about 362 tons gross burden, was built in 1878 for a stone barge, and used by the engineer for carrying stone during the construction of Stannard Rock light-station. In 1887 she was turned over to the light-house inspector, when she was so altered as to be used as a light-vessel, was fitted with a fog bell, and was placed at this point. She was removed from her station on December 14, 1899, and was replaced on April 10, 1900. Sufficient repairs were made last winter to keep her together.

By the act of June 6, 1900, the $15,000 appropriated by the act of July 1, 1898, for a steam light-vessel at Poe Reef, Straits of Mackinac, Michigan, was reappropriated for the construction of a light-vessel for Grossepoint. Plans for the new light-vessel are now being prepared. The old vessel is to be so repaired that she can be retained as a relief light-vessel for the district.

184. Lake Huron light-vessel No. 61, head of St. Clair River, Lake Huron, Michigan.—This wooden light-vessel is of about 107 tons gross burden, is fitted with a steam fog-signal, and is well adapted for her position. She was removed from her station on December 14, 1899, and was replaced on April 24, 1900. During the winter slight repairs were made to the hull, and the boilers were retubed.

207. Poe Reef light-vessel No. 62, entrance to South Channel, Straits of Mackinac, Lake Huron, Michigan.—This wooden light-vessel was built in 1893, and is of about 107 tons gross burden. She was removed from her station December 15, 1899, and was replaced April 21, 1900. Slight repairs were made during the winter.

—. *Martins Reef light-vessel, northwestern end of Lake Huron, Michigan.*—The following recommendation was made in the Board's last four annual reports:

It is proposed to place a light on Martins Reef as an aid to the great and increasing traffic between the mouth of the St. Marys River and the Straits of Mackinac.

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Since the great development of steel works at Chicago, Milwaukee, and Joliet, and the discovery of new and cheap ores suitable for making steel on the northerly shore of Lake Superior, the commerce passing from the mouth of the St. Marys River through the Straits of Mackinac into Lake Michigan has increased with rapidity. It is several times greater than it was five years ago. The vessels carrying ore from Duluth and Two Harbors to Lake Michigan ports are the largest in the lake-marine class. These vessels pass close to the dangerous Martins Reef, hence a light-vessel there is much needed. It is estimated that a proper light-vessel can be built and placed there for $15,000, and it is recommended that an appropriation of this amount be made therefor.

In the original estimate for this light-vessel a wooden vessel was contemplated. From information since received, and in view of the exposed and dangerous position she would occupy, it is now believed that it would be more economical to build this light-vessel of steel, with auxiliary steam power, as she could then not only place and maintain herself on her station, but she could also tow the Poe Reef light-vessel to and from her station, and thus effect a saving of about $150 a year. It is estimated that a suitable steam light-vessel for Martins Reef, with auxiliary steam power, can be built for $35,000. The Board therefore recommends that the proper measures may be taken to obtain an appropriation of this amount therefor.

FOG-SIGNALS OPERATED BY STEAM OR HOT AIR ENGINES.

183. Fort Gratiot, Mich.—This 8-inch steam whistle was in operation some 110 hours and consumed about 9 tons of coal.

184. Lake Huron light-vessel, No. 61, Michigan.—This 6-inch steam whistle was in operation some 104 hours and consumed about 6 tons of coal.

186. Sand Beach Harbor of Refuge, north main light, Michigan.—This 10-inch steam whistle was in operation some 87 hours and consumed about 9 tons of coal.

191. Port Austin Reef, Michigan.—This 10-inch steam whistle was in operation some 93 hours and consumed about 11 tons of coal.

195. Tawas, Mich.—This 10-inch steam whistle was in operation some 112 hours and consumed about 3 tons of coal. This fog-signal was established September 28, 1899.

199. Thunder Bay Island, Michigan.—This 10-inch steam whistle was in operation some 158 hours and consumed about 13 tons of coal.

202. Presque Isle, Mich.—This 10-inch steam whistle was in operation some 246 hours and consumed about 14 tons of coal.

203. Forty-mile Point, Michigan.—This 10-inch steam whistle was in operation some 181 hours and consumed about 5 tons of coal.

204. Spectacle Reef, Michigan.—This 10-inch steam whistle was in operation some 166 hours and consumed about 9 tons of coal.

206. Detour, Mich.—This 10-inch steam whistle was in operation some 157 hours and consumed about 16 tons of coal.

207. Poe Reef light-vessel No. 62, Michigan.—This 6-inch steam whistle was in operation some 127 hours and consumed about 9 tons of coal.

209. Cheboygan, Mich.—This 10-inch steam whistle was in operation some 175 hours and consumed about 15 tons of coal.

213. Round Island Michigan.—This 10-inch steam whistle was in operation some 142 hours and consumed about 7 tons of coal.

306. Point Iroquois, Michigan.—This 10-inch steam whistle was in operation some 289 hours and consumed about 23 tons of coal.

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307. Whitefish Point, Michigan.—This 10-inch steam whistle was in operation some 294 hours and consumed about 22 tons of coal.

310. Big Sable, Michigan.—This 10-inch steam whistle was in operation some 122 hours and consumed about 9 tons of coal.

315. Marquette, Mich.—This 10-inch steam whistle was in operation some 259 hours and consumed about 20 tons of coal.

318. Big Bay Point, Michigan.—This 10-inch steam whistle was in operation some 176 hours and consumed about 6 tons of coal.

319. Huron Island, Michigan.—This 10-inch steam whistle was in operation some 154 hours and consumed about 10 tons of coal.

320. Stannard Rock, Michigan.—This 10-inch steam whistle was in operation some 215 hours and consumed about 8 tons of coal.

349. Manitou, Mich.—This 10-inch steam whistle was in operation some 367 hours and consumed about 26 tons of coal.

354. Eagle Harbor, Michigan.—This 10-inch steam whistle was in operation some 312 hours and consumed about 26 tons of coal.

359. Portage Lake Ship Canal pierhead, Michigan.—This 10-inch steam whistle was in operation some 337 hours and consumed about 22 tons of coal.

360. Fourteen-mile Point, Michigan.—This 10-inch steam whistle was in operation some 128 hours and consumed about 5 tons of coal.

363. Outer Island, Wisconsin.—This 10-inch steam whistle was in operation some 213 hours and consumed about 9 tons of coal.

365. Lapointe, Wis.—This 10-inch steam whistle was in operation some 183 hours and consumed about 9 tons of coal.

368. Devils Island, Wisconsin.—This 10-inch steam whistle was in operation some 257 hours and consumed about 12 tons of coal.

370. Superior pierhead (front), Wisconsin.—This 6-inch steam whistle was in operation some 410 hours and consumed about 24 tons of coal.

388. Duluth (front), Minn.—This 10-inch steam whistle was in operation some 576 hours and consumed about 29 tons of coal.

390. Two Harbors, Minn.—This 10-inch steam whistle was in operation some 321 hours and consumed about 26 cords of wood.

394. Passage Island, Michigan.—This 10-inch steam whistle was in operation some 424 hours and consumed about 24 tons of coal.

DAY OR UNLIGHTED BEACONS.

There is but one unlighted beacon in this district and this is situated on the southern extremity of the reef off Stannard Rock, Lake Superior.

BUOYAGE.

The buoys marking the channels in the Detroit River, Lake St. Clair, St. Clair River, and Lake Huron, and those in Lake Superior, excepting the Pointe Abbaye bell and can buoys, were cared for by the tender *Marigold*. The buoys in Saginaw River, St. Marys River, Portage Lake and River, Michigan; Duluth-Superior Harbor, Minnesota and Wisconsin, and those off Pointe Abbaye, Lake Superior, were cared for by contractors. The buoys cared for by the tender and those in Saginaw River were taken up at the close of and replaced at the opening of navigation. Those cared for by contractors, excepting

those in Saginaw River, were allowed to remain in position during the winter, as it is impossible to raise them after navigation is closed by the ice. These buoys were overhauled, painted, numbered, etc., at the opening of navigation.

DEPOTS.

Detroit, Mich.—The walks in the depot yard were repaired and the hoisting derrick painted. An iron double gate was placed at the eastern entrance. It has an opening of 14 feet and is hung on iron posts placed on anchored concrete piers.

Sugar Island, St. Marys River, Michigan.—By the act approved July 1, 1898, an appropriation of $15,000 was made for establishing a light-house and buoy depot in the vicinity of Sault Ste. Marie, Mich. A topographical survey of the east side of the south end of Sugar Island, St. Marys River, in the vicinity of Rains dock, was made to aid in the selecting of a site upon which to erect the depot buildings. Tracings of the survey of this site were prepared and the land was purchased. Detailed drawings and specifications for the various structures were prepared and contracts were made. The contractors are purchasing the brick, cut stone, and cement required for the various constructions, transportation of which to the depot site is to be furnished by the Light-House Establishment.

TENDERS.

Marigold.—This iron screw steamer which was built in 1890 is of about 454 tons gross burden. A main deck was laid. Hawse pipes and stockless anchors were provided and fitted. A smokestack was provided and minor repairs were made. Extensive alterations were made for the installation of a gas-carrying plant of 15,000 cubic feet capacity, which was installed on the after part of the main deck. The gas-carrying plant is satisfactory and enables the tender to care for about 30 gas buoys. These alterations and new distribution of weights increases the carrying capacity of the tender and improves her seagoing qualities. She steamed about 12,023 miles and consumed some 754 tons of coal, delivering supplies to 224 lights and 31 steam fog-signal stations, and inspecting the light-stations.

Lotus.—This wooden steam screw launch of about 15 tons gross burden was laid up at the Detroit depot during the year, and is in a rotten, worthless condition, and totally unfit for service.

Amaranth.—This steel screw steamer was built in 1892, and is of about 744 tons gross burden. The spar, quarter, and main decks were renewed, new combings were placed under the pilot house and the texas, the old hawse pipes were replaced with two 12-inch pipes with flanges, etc., for use in connection with the tender's stockless anchors. The piping of the hot and cold water plumbing throughout the vessel was renewed, steam heaters were repaired, a new set of shaking grates was provided for the boilers, and a patch was placed on the rear of each of the 4 circular furnaces. She was employed by the engineer on inspection duty and visited all of the stations in the district, delivering more or less material for construction and repair to most of them. She conveyed 21 cords of stone to Tawas light-station, 36 cords to Spectacle Reef light-station, 181 cords of stone and two gas reservoirs to Mud Lake light-station, and transferred working parties, building material, and boilers and machinery to Fort

Eleventh District.

Gratiot, Tawas, and Port Austin Reef light-stations. During the year the tender delivered at various light-stations 2,600 tons of material. In doing this she steamed about 8,096 miles and consumed some 768 tons of bituminous coal. The tender was in winter quarters from October 18, 1899, to March 31, 1900, during which time she was repaired, and about 120 tons of coal were consumed. The *Amaranth* was in charge of the light-house inspector during April, 1900, and engaged under his direction in replacing buoys.

The launch of the Amaranth.—The boiler was repaired, both water coils, one-half of one steam coil, and 20 pieces of circulating pipe being renewed. A new ash pan, damper, and boiler sills were also provided. All valves and cocks of the engine were refitted. She was employed in connection with the work of rearranging the Portage Lake and River lights.

Tender for St. Marys River, Michigan.—It has been found that an extra steam light-house tender is needed in the Eleventh light-house district, to be used in and near St. Marys River, in consequence of the increase of commerce passing through that river and the great necessity for keeping its aids to navigation in the best possible condition. This steamer should be of iron with a specially strengthened bow for ice crushing. It should be about 100 feet long, should draw not more than 6 feet of water, and should be fitted with a first-class hoisting engine and derrick. It is estimated that such a tender can be built for not exceeding $60,000, and the Board therefore recommends that an appropriation of this amount be made therefor.

Scow lighter.—The hull was calked and a pump was provided.

TWELFTH DISTRICT.

his district extends from the boundary between California and ico to the boundary between California and Oregon. It embraces ids to navigation on the seacoast, bays, rivers, and other tidal ers of California.

spector.—Commander Uriel Sebree, United States Navy.

ngineer.—Maj. C. E. L. B. Davis, Corps of Engineers, United es Army.

here are in this district—

ht-houses and lighted beacons, including 3 post lights	47
ht-vessel in position	1
or unlighted beacons	51
-signals operated by steam	16
-signals operated by clockwork	10
istling buoys in position	15
l buoys in position	11
er buoys in position	73
mer *Madroño*, buoy tender, and for supply and inspection	1
am launch of *Madroño*	1
am launch *Hazel*, for construction and repairs	1

NOTE.—The number preceding the name of a light-station in the Twelfth and irteenth districts is that by which it is designated in the List of Lights and Fog-gnals on the Pacific Coast of the United States, corrected to February 1, 1900.

LIGHT-STATIONS.

1. Point Loma, entrance to San Diego Bay, California.—The roadway, which had been damaged by heavy rains, was repaired. Various repairs were made.

2. Ballast Point, San Diego Bay, California.—The assistant keeper's dwelling was repainted and assigned to the keeper of the beacon lights.

4. La Playa, San Diego Bay, California.—This light was moved about 380 feet to the southward and eastward and reestablished on top of the warehouse on the outer end of the quarantine wharf. A small bell struck by machinery a single blow every 3 seconds was installed on the end of the wharf.

5. Beacon No. 3½, San Diego Bay, California.—A four-pile beacon crowned with a lamp house was built in place of the black beacon between beacons Nos. 3 and 5, and on it a white lantern light was established.

8. Point Fermin, entrance to San Pedro Bay, California.—The dwelling, outhouses, and fence were painted. A small quantity of lumber was furnished to the keeper with which to make minor repairs.

9. Point Hueneme, entrance to Santa Barbara Channel, California.—The act of March 3, 1899, appropriated $2,000 for the purchase of 30 acres lying between the town of Hueneme and the light-station for a right of way. A satisfactory deed vesting the title to the property in the United States was executed by the owners, and the purchase money was paid to them. The governor of the lens-revolving apparatus was repaired. A new flag pole was purchased and erected.

10. Santa Barbara, Pacific Ocean, near Santa Barbara Landing,

Twelfth District.

California.—Minor repairs were made. The following recommendation, made in the Board's last three annual reports, is renewed:

The light-house at this station was built in 1856. It is of brick with the outer wall stuccoed. The light is shown from an old-fashioned lantern with triangular-shaped glass, built on top of the dwelling. The structure is unsightly and uncomfortable, and in winter the walls are damp. To put this building in good repair would cost as much, if not more, than to build a new modern structure. This can be done, it is estimated, for not exceeding $7,500, and it is recommended that an appropriation of that amount be made therefor.

11. Point Conception, entrance to Santa Barbara Channel, California.—One of the fog-signal boilers was retubed and a new bottom was put in. A set of eight new chariot wheels was purchased for the lens apparatus.

12. Point Arguello, about 12 miles northwest of Point Conception, seacoast of California.—The act approved March 3, 1899, appropriated $35,000 for establishing a light-house and fog-signal on this point. Since the passage of the act much time has been consumed in obtaining the right to take water from a spring on land adjoining the reservation and in securing rights of way to the county road. These matters being satisfactorily adjusted, bids for the construction of the station were opened on March 22, 1900, and the contract was let for $17,000. Actual construction work will probably be commenced early in July, 1900.

13. San Luis Obispo, seacoast of California.—The landing wharf was repaired and extended 50 feet to where there was 6 feet depth of water at low tide. The surfboat of the tender can now land materials at all times. In enlarging the wharf, room was afforded for the storage of spare buoys. A fence was built around the reservoir to protect it from cattle. The new smokestacks were put up on the fog-signal boilers, and a new injector was furnished for one of the boilers. Various repairs were made.

—. *Point Buchon, about 8 miles northwest from Point San Luis Obispo.*—The recommendation was made in the Board's last three annual reports, and several previous ones, that an appropriation be made to establish a light and fog-signal at this point, at an estimated cost of $33,000.

This point is in San Luis Obispo County, and is 17 miles distant from the town of San Luis Obispo by wagon road and trail. The nearest light-house is Piedras Blancas, about 30 nautical miles to the northward and westward. The point is prominent, and with its outlying rocks is very dangerous to navigators close inshore during a fog, especially as vessels going to and from Port Hartford make a sharp turn just off this point.

It is now estimated that it will cost $40,000 to establish this light and fog-signal station, and it is recommended that an appropriation of that amount be made therefor.

15. Point Sur, seacoast of California.—Extensive repairs and improvements were made. When the station was built a tramway was laid from the sandpit near the landing beach to the top of the rock, 285 feet above, and from there over the crest and down the seaward side of the rock to the tower and signal. Part of the road was on an inclination of 30°. The car was drawn up this incline by a hoisting engine. The roadbed was expensive to maintain, and somewhat dangerous. It was in need of extensive repairs, and it was determined, rather than make large expenditures on it, to build a roadway for teams leading around the rock and thus up to the tower and dwell-

Twelfth District.

ings. This work was begun early in the year and carried on until the end of January, 1900, when it was stopped on account of the cost exceeding the estimate, due to the character of the rock encountered and the very stormy weather preventing advantageous work. At this time the road was nearly completed from the sands to the turntable on the seaward side of the rock, and partly excavated from there to the tower and fog-signal, with a large turning place at the latter point finished. A barn was built on the top of the hill to replace the old one at the sandpit, and stone bulkheads were nearly finished around the dwellings and engine house to stop the erosion of the earth from their foundations. In June, 1900, a contract was let for the completion of the roadway and bulkheads. Work was begun and is now in progress. The pipe line authorized for this station was not put in, as satisfactory arrangements could not be made with the owners of the spring. It will be necessary to replace the old and worn-out pumping machinery with new apparatus in the near future. A new set of chariot wheels was made and the old set trued up. One first-order burner was put in good condition. Two new governors were purchased for the fog-signal machinery.

The following recommendation, made in the Board's last four annual reports, is renewed:

The accommodation for the four keepers at this station is insufficient, and it is recommended that an appropriation of $6,000 be made to build a new cottage.

16. Point Pinos, entrance to Monterey Bay, California.—A brickoil house was built. The roadway inside the reservation was repaired and graveled. Various repairs were made. The act of June 6, 1900, appropriated $2,000 for the purchase of the land lying between the light-house lot and the ocean. Measures are being taken to acquire title to this land.

18. Año Nuevo Island, on the seaward side of Año Nuevo Island, California.—A small frame structure, with plate-glass panes, was built around the lens lantern to protect it from the weather. The fog-signal building begun last year was completed, and part of the old signal building was connected with it by an inclosed gallery, so that it can be used as a coal house and tool room. The tramway leading from the landing was rebuilt, and a new storehouse at the landing was built, with the upper story on a level with the tramway and a lower floor on the beach. A hoisting apparatus for the handling of supplies was put in. Cement walks were made around the signal and dwelling, and the wooden walks on the trestles over the gulleys were repaired.

19. Pigeon Point, extreme end of Pigeon Point, seacoast of California.—The new fog-signal building begun last year was completed. A new first-order burner was issued to the keeper for use in the illuminating apparatus. Minor repairs were made to the fog-signal apparatus.

The following recommendation, made in the Board's last six annual reports, is renewed:

There are standing, outside of the light-house site, but close to the fence inclosing the light-house structures, a fisherman's shanty and a hay barn. If a fire should break out in either of these buildings it would endanger the structures of the light-station. It is proposed, in order to obviate this danger, that an additional strip of land to the eastward of the station, say 150 feet wide, be purchased and added to the light-house reservation. This, it is estimated, can be done for not exceeding $5,000, and it is recommended that an appropriation of this amount be made therefor.

Twelfth District.

20. Point Montara, above Pillar Point, seacoast of California.—The bridge on the Government road leading to this station was rebuilt. For the improvement and increase of the water supply a new hydraulic ram was purchased and sent to the station. Another tank of 10,000 gallons capacity was purchased and the old one was taken down and repaired, and both were set up on masonry foundations. A frame structure covered with shingles was built, inclosing both tanks, to protect them from the weather. A red-lens lantern will be installed here when it is received.

21. Farallon Island, on southeast Farallon Islet, off the entrance to San Francisco Bay, California.—The new smokestack, with arch connecting it with the boilers, and two breechings, purchased last year, were set up. An interchangeable switch telephone system was installed in place of the electrical call-bell system, connecting the tower, signal, and keepers' dwellings. Minor repairs were made.

23. Bonita Point, entrance to San Francisco Bay, California.—A new steam chest was made for one of the sirens and the machinery was overhauled and repaired. The windmill, which was damaged by a heavy gale, was repaired and new parts were supplied. A large slide of rock from the hill over the tunnel on the trail from the dwellings to the light-house and signal carried away a bridge spanning a gulley. The bridge was rebuilt and the overhanging and loosened rock was blasted off to prevent a recurrence of the accident. The tramway leading from the landing to the signal was overhauled and repaired, and the flight of steps from the wharf was rebuilt.

24. Fort Winfield Scott, Fort Point, California.—A steel bridge from the bluff to the fort, on which the light and signal are established, was built to take the place of a wooden structure which had become unsafe.

The following recommendation, made in the Board's last annual report, is renewed:

The present Fort Point fog-signal, a bell struck by machinery, has long been complained of as inadequate, both in position and power. It is proposed to replace it with a second-class Daboll trumpet, blown by compressed air, and to place it on the top of the northwest bastion of Fort Winfield Scott, Fort Point, California, which will bring it directly over the present location of the bell. It is estimated that this can be done for not exceeding $7,000, and it is recommended that an appropriation of this amount be made therefor.

—. *Quarry Point, Angel Island, San Francisco Bay, California.*—The following recommendation, made in the Board's last eight annual reports, is renewed:

Various petitions have been received from those representing marine interests, asking that a fog-signal be established at this point. The passage between the eastern side of Angel Island and Southampton Shoal is quite narrow. The strong tides setting in and out through the Golden Gate have full force on a vessel bound up or down the bay, and in the case of ships being towed, as so many are, past this point, the set of the current is enough to make it hazardous, there being danger either of running aground on Southampton Shoal or Angel Island. An enormous quantity of shipping annually passes this point, bound to or from the great grain wharves at Port Costa, the Sacramento and San Joaquin rivers, and Mare Island Strait. Hundreds of the largest sailing ships are towed from San Francisco to Port Costa, where they load with grain, and are then towed down and out to sea. In this way there is more shipping passing through these waters than anywhere else in the district, except through the Golden Gate. There have been a number of casualties in the vicinity of this point.

Among many were the following:

The ferry steamer *Contra Costa*, plying between San Francisco and San Quentin with passengers, ran ashore near California City.

Twelfth District.

The ship *E. B. Sutton*, while being towed down from Port Costa, ran ashore near Quarry Point, Angel Island.

The ship *Eleanor Margaret*, bound to Port Costa, ran ashore on Bluff Point, Raccoon Straits.

The ship *Maulsden*, while being towed to Port Costa, ran ashore on Southampton Shoal.

Mariners have asked that Quarry Point be selected for the fog-signal station, because, to make a start upriver in a fog, it is necessary to make Angel Island to get a departure. After careful examination the Board reached the conclusion that a fog-signal at this locality would be a decided aid to mariners. In view of the great economy of establishing and maintaining a large fog bell here instead of a steam fog-signal, it decided in favor of the former. It is estimated that it will cost $6,000 to establish this fog bell, and it is recommended that an appropriation of this amount be made therefor.

26. Angel Island, San Francisco Bay, California.—A fixed red lens-lantern light will be installed as soon as the lantern is received.

27. Alcatraz Island, San Francisco Bay, California.—The fog bell was moved from its original site to a position on higher ground 140 feet to the northward and set up, with a new striking apparatus, in a new building. In its present position the effectiveness of the signal is greatly increased, as it may now be heard on both sides of the point of the island.

28. Yerba Buena Island, San Francisco Bay, California.—The stone wall at the end of the fog-signal building was wainscoted and finished to correspond with the rest of the interior work. The line dividing the light-house premises from the other part of the island was run by survey and marked by stone monuments. A wire fence with a top rail was put up on the line to prevent trespass.

40. Point Reyes, Pacific Ocean, California.—The fog-signal boiler was retubed. Both were otherwise repaired and put in good order. Some 2,400 feet of lumber and the necessary hardware were sent to the station for repairs to the fencing and coal chute. A cement rain-shed of 6,000 square feet area was made to increase the water supply and a new 25,000-gallon tank was built to increase the storage capacity. This work was done under contract.

42. Cape Mendocino, seacoast of California.—Two first-order burners were repaired and a set of chariot wheels trued up. The act approved June 6, 1900, appropriated $1,000 for the construction of a fireproof oil house at this station. The work of construction will be taken in hand as soon as possible. The assistant keeper and family are housed in an old frame structure formerly used as an oil house. It is unsuitable for the purpose, and recent illness and death in the keeper's family are attributed to its unsanitary condition.

The following recommendation, made in the Board's last four annual reports, is renewed:

The plans approved by the Board contemplated the construction of an additional cottage for the assistant keeper. It is estimated that a proper structure can be erected for $5,500, and it is recommended that an appropriation of that amount be made therefor.

44, 45, 46. Humboldt Bay, California.—The beacon from which the north jetty light is displayed was rebuilt, and a plank walk 1,200 feet long was laid. A small frame oil house was built on the south spit to hold a supply of oil for the beacons near by. This recommendation, made in the Board's last annual report, is renewed:

There are three lights maintained on the jetties to guide vessels in over the bar. These, however, are ineffective in thick or foggy weather by day or night. It is evident that a fog-signal is much needed here. It is estimated that a proper fog-

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signal can be established on either the north or south jetty at a cost not to exceed $15,000. The Board therefore recommends that an appropriation of this amount be made therefor.

50. Trinidad Head, Pacific Ocean, California.—A barn was built, and 200 feet of fencing was rebuilt.

The act of March 3, 1899, appropriated $250 for the construction of a telephone line from the light-station to the town of Trinidad, there to connect with the general telephone system. An agreement was made with the Sunset Telephone Company to erect the line and make connection with the general system operated by them. The company controls the Bell telephone on this coast, which can not be purchased, but must be rented from them, as on no other conditions can connections be made with the general system. The line was completed and accepted in July, 1899. It consists of galvanized steel wire hung in return circuit, and supported on redwood poles placed 150 feet apart. As the line has proved to be of no use to the Light-House Establishment, and as the Sunset Company charged a rental of $60 a year for the use of the instruments, the Board ordered the service discontinued on June 30, 1900.

REPAIRS.

During the year repairs more or less extensive were made at the following-named stations:

14. Piedras Blancas, Cal.
17. Santa Cruz, Cal.
25. Lime Point, Cal.
29. Oakland Harbor, Cal.
31–32. South San Francisco range lights, Cal.
33. East Brother Island, Cal.
34. Mare Island, Cal.
35. Roe Island, Cal.
41. Point Arena, Cal.
43. Humboldt, Cal.
—. Humboldt, Old Station, Cal.
51. Crescent City, Cal.
52. St. George Reef, Cal.

LIGHT-VESSELS.

22. San Francisco light-vessel No. 70, off San Francisco Bar, California.—This composite steam light-vessel, built in 1897–98, is of about 400 tons gross burden. She was, on September 20, 1899, towed to San Francisco. A first-class black can buoy marked "Light-vessel moorings" marked her station. She was docked, her copper was examined and repaired, her bottom and propeller were cleaned, all outside valves were overhauled and cleaned, the main and spar decks were calked, the lightning rod was repaired, the guard rail was repaired and extended, and the cradle was altered to fit the new boat. The stop valves on the donkey boilers were overhauled and repaired; the blow cocks on the main and donkey boilers, gauge column of main boiler, and air pump were overhauled and put in order; a piston rod was put on the air pump; the fire and sanitary pumps were repaired; the fog-whistle valve was overhauled and ground in. Metallic packing was put in the dynamo engines and their main bearings were planed down, the journals on commutator ends were rebabbitted and centered, and the crank pins and crossheads were repaired.

The propeller being loose on the tail shaft, it was removed, the tail shaft was relined, and the propeller was replaced. The main engine was overhauled, a valve on the main engine was reset, the tubes and stay bolts in the back connections of the main boiler were calked, the lap streaks in the bottom of the boilers were recalked, the suction

Twelfth District.

pipe for the circulating pump was repaired, the packing in steam chest was renewed, and slight repairs were made to the after tanks. An 18-foot standard boat was furnished.

The bunkers were filled with coal and stores were taken aboard when the vessel returned to her station on October 8, 1899, after an absence of eighteen days.

Owing to the dense fog prevailing while light-vessel No. 70 was undergoing repairs, the light-house tender *Madroño* was moored in her place as a relief light-vessel from September 28 to October 8, 1899.

On May 5, 1900, owing to a leaky tube in the main boiler and the bad condition of the donkey boilers, oil lamps were substituted for the electric lights. As the weather was favorable, advantage was taken of the opportunity to scale and clean the main boiler. The electric lights were exhibited on May 11, after a stoppage of six days. During this period no fog prevailed except for about an hour or so, when the bell was rung.

Permission was granted an expert to visit light-vessel No. 70 during the latter part of August to experiment with wireless telegraphy. He remained on board about seventeen days. The experiment was not entirely successful.

The arrangement has been renewed with the gasoline schooner *Ida A.* to stop at this vessel once every other week, on her way to and from the Farallon Islands, for the transportation of mail, men, and supplies.

During the past year this vessel consumed about 49 tons of coal to operate the fog-signal alone, about 312 tons for the electric lights, and some 135 tons additional for all other purposes, making a sum total of about 496 tons used for all purposes.

The steam chime whistle broke down at 2 a. m. June 18, 1900. A spare valve was sent out and adjusted. Repairs were completed and the whistle ready for operation on June 26, after a stoppage of 8½ days. During the prevalence of fog a bell was struck by hand, 86 hours in all.

—. *Relief light-vessel for the Twelfth and Thirteenth light-house districts, Pacific coast.*—The following recommendation was made in the Board's last three annual reports:

There are now three light-vessels stationed at important points on the Pacific coast—one in the Twelfth and two in the Thirteenth light-house districts. If it becomes necessary to temporarily withdraw any one of these vessels, there is no relief light-vessel to replace it. Such a vessel is urgently needed. It is estimated that one can be built for not exceeding $80,000, and it is recommended than an appropriation of this amount be made therefor.

This vessel could have been built for the sum named at the time the estimate was made. But now, owing to the increase in the cost of labor and material, she can not be built for less than $90,000; the Board therefore recommends that an appropriation of this amount be made therefor.

—. *Blunts Reef light-vessel, Pacific Ocean, off Cape Mendocino, California.*—The following recommendation, made in the Board's last two annual reports, is renewed:

Officers of the Revenue-Cutter Service and of the Coast and Geodetic Survey in the spring of 1898 called the attention of the Board to the need of additional aids to navigation at this point. Cape Mendocino forms a projecting angle into the Pacific Ocean, and is the turning point for vessels bound up or down the coast, and it is important that vessels bound up or down the coast should be able at all

Twelfth District.

times to know when this point is reached. The light shown at Cape Mendocino is sufficient on clear nights, but in thick weather it is of little, if any, use, and the light-station here is without a fog-signal. Blunts Reef is dreaded by coasting sailors, as will be evident from the following extract from The Pacific Coast Pilot:

"For many years the passage between the reef and the cape was generally used by coasting steamers and lumber vessels. but the examinations of 1870 and 1872 have shown the passage to be a very dangerous locality, and the insurance companies will not underwrite vessels using it."

The chart of the vicinity shows that Blunts Reef is nearly 3 miles from the cape. The Board is of opinion that a first-class light-vessel, with steam power, steam fog-signal, and an electric light should be placed off Blunt's Reef. It is estimated that such a vessel can be built for $90.000, and it is recommended that an appropriation of this amount be made therefor.

DAY OR UNLIGHTED BEACONS.

Anita Rock Spindle, San Francisco Bay, California.—An iron spindle, crowned with iron cage. The color of the cage was changed from red and black horizontal stripes to white, the color of the spindle itself remaining red and black.

Black Beacon, San Diego Bay, between Beacons Nos. 3 and 5, California.—This single-pile black beacon, without number, was discontinued and a four-pile beacon supporting a tubular lantern showing a white light was substituted for it.

Beacon No. 7, San Diego Bdy, California.—This single-pile black beacon crowned with a box, and marked with the figure "7," was destroyed in January, 1900. As it is no longer needed it will not be rebuilt.

Beacon No. 4, San Pedro Harbor, California.—A single-pile red beacon crossed with boards, and marked with the figure "4." Was injured by a collision and was repaired.

Beacon No. 11, Alviso Channel, San Franciseo Bay, California.—A three-pile black beacon crossed with slats, and marked with figures "11" in white, was destroyed on December 29, 1899, and was rebuilt on February 17, 1900.

FOG-SIGNALS OPERATED BY STEAM.

11. Point Conception, California.—This 12-inch steam whistle, in duplicate, was in operation some 243 hours, and consumed about 35 tons of coal.

13. San Luis Obispo, Cal.—This 10-inch steam whistle, in duplicate, was in operation some 1,348 hours, and consumed about 88 tons of coal.

15. Point Sur, California.—This 12-inch steam whistle, in duplicate, was in operation some 1,029 hours, and consumed about 107 cords of wood.

18. Año Nuevo Island, California.—This 12-inch steam whistle, in duplicate, was in operation some 1,020 hours, and consumed about 52 tons of coal.

19. Pigeon Point, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 935 hours, and consumed about 79 cords of wood.

20. Point Montara, California.—This 12-inch steam whistle, in duplicate, was in operation some 1,035 hours, and consumed about 93 tons of coal.

21. Farallon, California.—This first-class steam siren, in duplicate, was in operation some 989 hours, and consumed about 57 tons of coal.

Twelfth District.

22. San Francisco light-vessel No. 70, California.—This 12-inch steam chime whistle was in operation some 757 hours, and consumed about 49 tons of coal. The bell sounded for about 90 hours The *Madroño's* steam whistle was in operation some 69 hours while she acted as a relief for the light-vessel.

23. Bonita Point, California.—This first-class steam siren, in duplicate, was in operation some 1,765 hours, and consumed about 137 tons of coal.

25. Lime Point, California.—This 12-inch steam whistle, in duplicate, was in operation some 906 hours, and consumed about 94 tons of coal.

28. Yerba Buena, California.—This 10-inch steam whistle, in duplicate, was in operation some 128 hours, and consumed about 17 tons of coal.

33. East Brother Island, California.—This 12-inch steam whistle was in operation some 227 hours, and consumed about 26 tons of coal.

40. Point Reyes, California.—This 12-inch steam whistle, in duplicate, was in operation some 1,674 hours, and consumed about 119 tons of coal.

41. Point Arena, California.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 1,556 hours, and consumed about 137 cords of wood.

43. Humboldt, Cal.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 478 hours, and consumed about 46 cords of wood.

52. St. George Reef, California.—This 12-inch steam whistle, in duplicate, was in operation some 730 hours, and consumed about 40 tons of coal.

BUOYAGE.

The buoyage in this district is in good condition. A third-class nun buoy, painted red and numbered 2, was placed in 12 feet of water on the east side of the channel leading into North Bay, Humboldt Bay, California. The channel is narrow and the currents strong at this point; there is a strong eddy current near the north jetty at times. The inside bar buoy, San Francisco entrance, California, was dragged out of position by a lumber raft; on September 1,1899, it was replaced. The whistling buoy off Point Buchon was reported not sounding, and on September 10, 1899, it was put in working order. The Arena Cove, California, bell buoy, was reported not sounding, and on March 15, 1900, it was repaired. The Eel River Bar buoy, a second-class nun buoy, black and white perpendicular stripes, disappeared, and it was not replaced, as no vessels are now crossing the bar. The third-class wooden-spar buoy off outer end north jetty, Humboldt Bay, California, was replaced by a first-class iron-spar buoy. Because of the accidental dumping of a barge load of rock about 250 feet northeast of Whaler Island, San Luis Obispo Bay, California, a small wooden buoy was placed on September 17, 1899, to mark temporarily this menace to navigation. A third-class spar buoy was placed as a permanent mark and the wooden buoy removed. On September 12, 1899, a whistling buoy was established in 114 feet of water off Santa Barbara, Cal. On September 21, 1899, a second-class spar buoy was established at the entrance to the recently completed 20-foot channel into Oakland, Cal., harbor. The Outside Bar Bell buoy, San Diego entrance, California,

was reported not sounding, and on January 26, 1900, it was put in working order. On November 18, 1899, the Point Pinos whistling buoy went adrift, and it was recovered by the *Madroño* the next day about 2 miles south of the light-house, close in shore, and on January 20, 1900, it was replaced.

On December 4, 1899, the color of the cage on top of the iron spindle on Anita Rock, San Francisco Bay, was changed to white, the coloring of the shaft remaining red and black horizontal stripes. On December 9, 1899, two spar buoys, Nos. 1 and 5, were established in Humboldt Bay, California, to mark the channel to South Bay. On November 24, 1899, a schooner reported a bell buoy adrift 45 miles west of Point Reyes. From the description it was evidently the buoy from Noonday Rock. Another buoy was placed on December 2, 1900, to mark this rock. A few days later the drifting buoy was again reported some 40 miles west of Point Arena, but it could not be found by the tender, and has not been heard of since. On January 10, 1900, Saunders Reef whistling buoy parted its moorings and went ashore at Cleone, near Point Arena light-house; it is well up on the beach and an effort will be made to recover it. It has not yet been replaced. On January 25, 1900, San Pedro entrance buoy No. 1 was moved about 100 feet to the southward and eastward of its former position into 17 feet of water, to give more room in the channel. On February 16, 1900, Middle Ground buoy No. 5, Suisun Bay, California, recently adrift, was replaced about $\frac{1}{10}$ mile W. $\frac{3}{4}$ N. of its former position. On February 2, 1900, Fauntleroy Rock bell buoy was reported as not sounding; it was put in working order March 13. It was again disabled March 24. On March 6, 1900, Blunts Reef whistling buoy, off Cape Mendocino, California, was reported as missing; it probably sunk, as no vessel reported seeing it; another buoy was placed on March 14 in 153 feet of water, about 1 mile outside the outer rock. On June 29, 1900, Presidio Shoal buoy, San Francisco Bay, California, was run down by a passing vessel and set adrift; it was replaced on July 2, 1900. On December 29, 1899, 3 third-class can buoys, 3 third-class nun buoys, and 6 iron sinkers, of 1,800 pounds each, were shipped to the island of Guam for use in its harbor.

WHISTLING BUOYS IN POSITION.

San Diego Bar, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "S. D.," in good condition.

Point Vincente, California.—A second-class whistling buoy, painted red and marked "Pt. V.," in good condition.

Point Hueneme, California.—A second-class whistling buoy, painted red and marked "Pt. H.," in good condition.

Santa Barbara, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "St. B.," in good condition. It was established on September 12, 1899.

Point Arguello, California.—A second-class whistling buoy, painted red and marked "Pt. A.," in good condition.

Point Buchon, California.—A second-class whistling buoy, painted red and marked "Pt. B.," in good condition.

Piedras Blancas, California.—A second-class whistling buoy, painted red and marked "P. B.," in good condition.

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Point Pinos, California.—A second-class whistling buoy, painted red and marked "Pt. P.," in good condition.

Santa Cruz, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "S. C.," in good condition.

Duxbury Reef, California.—A second-class whistling buoy, painted black and marked "Duxbury Reef," in good condition.

Saunders Reef, California.—A second-class whistling buoy, painted red and marked "S. R." It parted its moorings and went ashore on January 10, 1900. It will be replaced as soon as the tender is available.

Fort Bragg Landing, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "F. B.," in good condition.

Blunts Reef, Cape Mendocino, California.—A first-class whistling buoy, painted red and marked "Blunt," in good condition.

Humboldt Bar, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "H. B.," in good condition.

Crescent City, California.—A second-class whistling buoy, painted black and white perpendicular stripes and marked "C. C.," in good condition.

On March 5, 1900, the Board directed the establishment of a whistling buoy off Point Fermin, California. It will be placed as soon as practicable.

BELL BUOYS IN POSITION.

San Diego Bar, California.—A first-class bell buoy, painted black and white perpendicular stripes and marked "S. D.," in good condition.

San Pedro Bay, California.—A first-class bell buoy, painted red and black horizontal stripes and marked "S. P.," in good condition.

San Luis Obispo Bay, California.—A first-class bell buoy, painted red and black horizontal stripes and marked "S. L.," in good condition.

Mouse Rock, Estero Bay, California.—A first-class bell buoy, painted black and marked with the letters "M. R." in white, in good condition.

Monterey Bay, California.—A first-class bell buoy, painted red and marked with the letter "M." in white, in good condition.

Noonday Rock, California.—An improved first-class bell buoy, painted red and black horizontal stripes and marked "Noonday Rock," in good condition.

Mile Rock, California.—An improved first-class bell buoy, painted red and black horizontal stripes, in good condition.

Point Arena, California.—A first-class bell buoy, painted black and white perpendicular stripes and marked "Pt. Arena," in fairly good condition. This buoy went adrift on July 3, 1900. It was towed into Arena Cove, when the bell was silenced, to await arrival of tender.

Point Delgado, California.—A first-class bell buoy, painted black and marked "Delgado" in white, in good condition.

Humboldt Bar, California.—A first-class bell buoy, painted black and white perpendicular stripes, in good condition.

Crescent City, California.—A first-class bell buoy, painted black and marked "C. C.," not in good condition. The bell sounds only at intervals.

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DEPOT.

Yerba Buena Island.—The sea wall in front of the depot keeper's quarters, which was partially destroyed last year, was rebuilt and underpinned with stone. A stone wall was also built flanking the boatways, to protect them from the waves and drift.

Large supplies of mineral oil are at times held at this depot waiting distribution. This has been deemed hazardous to the depot buildings and to the supplies stored in them, hence it is proposed to build an oil house in a position entirely removed from the other buildings. Such a position is found to the northward of the wharf, on a rocky bench at nearly the same level as the deck of the wharf. The site can be prepared at small cost, and a structure of brick, with an iron roof, can be built at an estimated cost of $8,000. The Board recommends that an appropriation of this amount be made therefor.

TENDERS.

Madroño.—This iron-screw steamer was built in 1885, is of about 412 tons gross burden, and was employed in attending to the buoyage, supply, and inspection of the district. She changed, placed, or replaced 60 buoys, painted or repaired 1 beacon, landed some 1,262 tons of coal at 25 stations, delivered supplies at 39 stations, conveyed the inspector to all the stations except Cape Mendocino and Humboldt, which are visited by other means of conveyance, making 117 inspections during the year. In doing this she steamed about 7,400 miles upon a consumption of some 704 tons of bituminous coal. The crew were employed at the light-house depot 352 hours, and the vessel has been laid up 93 days for repairs to hull and machinery, when leaky patches in back connections and shell were renewed, the ends of the tubes in the feed-water heater were rolled, leaky patch on the door frame was renewed, leaky studs for aprons were renewed, leaky seams in furnaces and connections were calked, the legs of both boilers were soft patched, two soft patches were put in the furnaces, the low-pressure crank-pin brasses were bored out and refilled with antifriction metal, and a new set of air-pump valves were furnished.

The following-named repairs were made or are now under way at Mare Island Navy-Yard, viz:

New boilers were installed, piping is being connected, electric-light plant was installed, the steam steering gear was set up, the condenser was retubed, the high-pressure cylinder was bored out, new piston and packing rings were made, new packing rings were supplied to the low-pressure piston, a grease trap or filter was supplied, and two Worthington pumps and two Hancock inspirators were furnished.

The contract to construct the new boilers for this vessel and deliver them at Mare Island Navy-Yard within three months of the receipt of the material was signed July 14, 1900.

The material for the furnaces was received March 23, and the boilers were completed and delivered at Mare Island Navy-Yard on June 5, 1900.

On May 2 the *Madroño* was sent to Mare Island Navy-Yard to be in readiness to receive the new boilers and to undergo a general overhauling. The repairs are to be completed by August 15, 1900.

The ship's boats, rigging, etc., are in good condition. A new whaleboat was furnished during the year, and a new surfboat is now

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in course of construction and an Alco vapor 21-foot launch was ordered.

The tender *Madroño* was moored off San Francisco Bar, as a relief light-vessel, from September 28 to October 8, 1899, a period of ten days, when her steam whistle was in operation some 69 hours.

The *Madroño* has been docked twice during the year, when her bottom was painted.

The Madroño's steam launch.—This launch, which is used for communicating with the depot on Yerba Buena Island and for distributing supplies to harbor stations, etc., is in good condition.

During the year the coal bunkers and water tanks were repaired and a new tail shaft put in. She ran about 1,200 miles on a consumption of some 17 tons of coal.

Hazel.—This small wooden screw launch is of about 7 tons gross burden, and was used in attending construction parties at the bay stations. In January, 1900, she was taken from the water and scraped and painted.

Tender for the engineer of the Twelfth light-house district.—The following recommendation was made in the Board's last two annual reports:

There is now no tender for the engineer service of this important district. The only tender that can go to sea is almost constantly employed by the inspector in supplying and inspecting the light-stations and in caring for its buoys. The steam launch can be used only in the sheltered waters of San Francisco Bay. An additional tender is much needed, capable of attending to construction and repair work at the several exposed stations in this district, which extends along the Pacific coast from the boundary between California and Mexico to the boundary between California and Oregon. It is estimated that a proper tender for this duty can be built for not exceeding $90,000, and it is recommended that an appropriation of this amount be made therefor.

When the estimate for this vessel was made it could have been built for the sum named. It can not now be built for less than $125,000, and the Board recommends that an appropriation of this amount be made therefor.

THIRTEENTH DISTRICT.

This district extends from the boundary between California and Oregon to the northern boundary of the United States, and includes Alaska. It embraces all aids to navigation on the seacoasts of Oregon and Washington, and the United States waters of the Strait of Juan de Fuca, Washington Sound, and the Gulf of Georgia, and on the tidal waters tributary to the sea, strait, sound, and gulf between the limits named, together with those on Alaskan waters.

Inspector.—Commander W. L. Field, United States Navy, to November 1, 1899; Commander Edward D. Taussig, United States Navy, to May 8, 1900; Commander William P. Day, United States Navy, from May 13, 1900.

Engineer.—Capt. William C. Langfitt, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 101 post lights	138
Light-vessels in position	2
Day or unlighted beacons	48
Fog-signals operated by steam, caloric, or oil engines	15
Fog-signals operated by clockwork	4
Whistling buoys in position	8
Bell buoys in position	5
Other buoys in position	279
Steamer *Manzanita*, buoy tender, and for supply and inspection	1
Steamer *Columbine*, for construction and repairs	1

LIGHT-STATIONS.

50. Cape Blanco, Oregon.—The following recommendation, made in the Board's last three annual reports, is renewed:

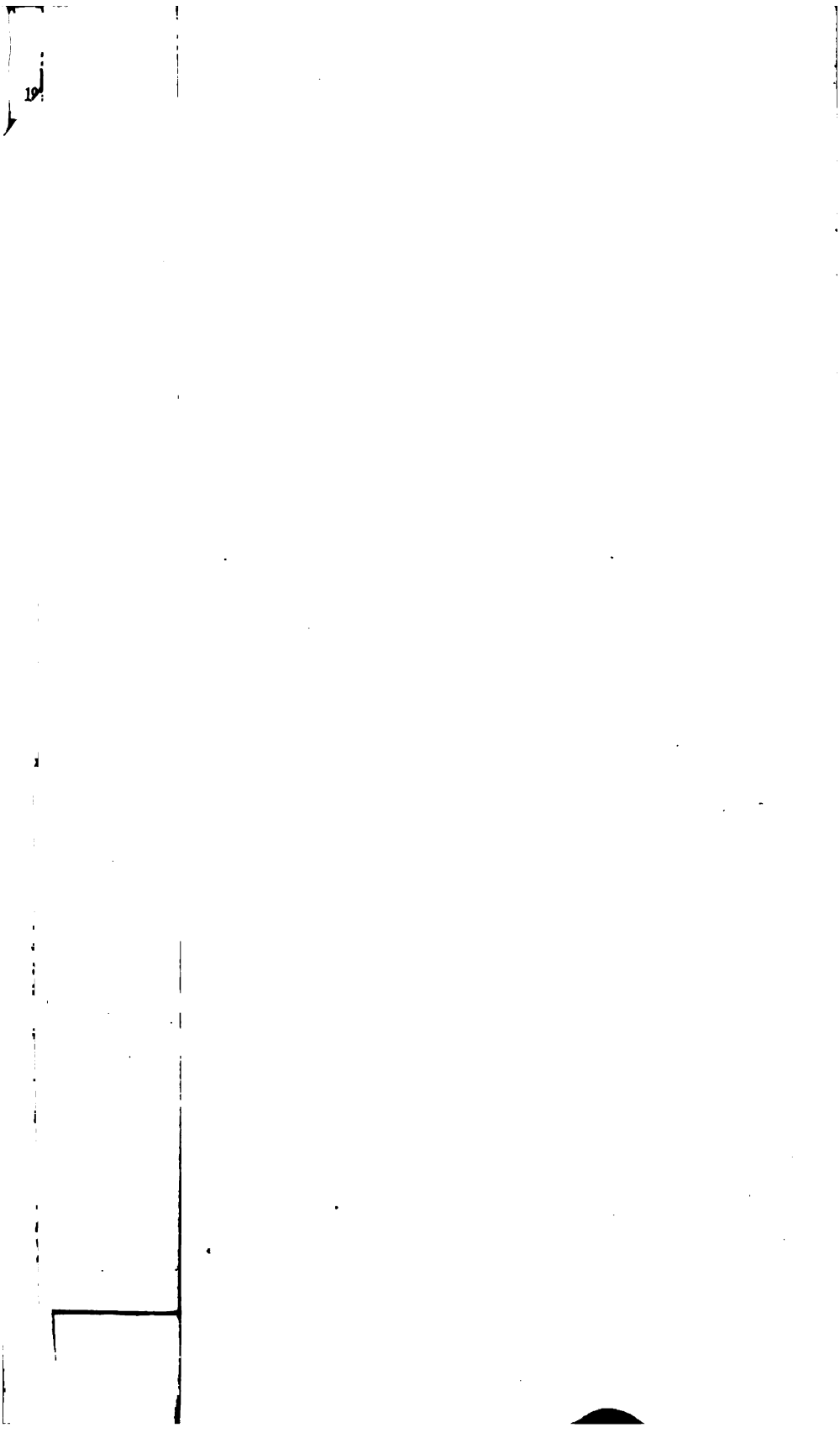
The quarters are insufficient for the three keepers. They can not be added to or altered to meet the needs of the station. It is estimated that a suitable new building can be erected for not exceeding $4,500, and it is recommended that an appropriation of that amount be made therefor.

54. Coquille River, Oregon.—During a heavy storm the high water carried away the water tank and foundation of the oil house and about 75 feet of walk leading to the light and fog-signal building. The oil house was recovered and placed on high ground, but has not been reerected. A new water tank was purchased and placed on a concrete foundation. The fog-signal apparatus and the lighting apparatus were thoroughly overhauled and put in good working order. Minor repairs were made.

70. Yaquina Head, Oregon.—A hot-water heating apparatus was installed in the tower. A new cistern of 15,000 gallons capacity was built to replace the old one.

The following recommendation made in the Board's last annual report is renewed:

The quarters furnished the three keepers are insufficient for their needs. These quarters can not be added to or altered to meet the needs of the station. A new building is required. It is estimated that a suitable one can be erected for not exceeding $4,000, and the Board recommends that an appropriation of that amount be made therefor.



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74. Fort Stevens, Oreg.—By the act approved June 11, 1896, $11,000 was appropriated for discontinuing the Point Adams light-station and reestablishing it with a fog-signal near the outer end of the Fort Stevens wharf. On March 23, 1897, the site was selected, but at that time it was in dispute between the War Department and private parties. This question was settled by the United States court. By the act approved June 6, 1900, the $11,000 appropriated for this station by the act of June 11, 1896, was made available for a light-station at Desdemona Sands, Oregon.

—. *Desdemona Sands, mouth of Columbia River, Oregon.*—By act approved June 6, 1900, $24,000 was appropriated for establishing a light and fog-signal station near the lower end of the Middle Ground, Desdemona Sands, mouth of the Columbia River, Oregon, in addition to the $11,000 appropriated by the act approved June 11, 1896, for Fort Stevens light and fog-signal station, which by the act of June 6, 1900, was made available for this light and fog-signal. Work will be started at once on the plans and specifications for these structures.

135. Cape Disappointment, Washington.—On February 25, 1898, the contractor for the erection of this station filed suit in the United States circuit court against the United States to recover $5,868 damages which he claimed to have sustained because of alleged delay in delivering to him the metal work beyond the time specified in the contract. This suit was tried on June 29, 1899, and on July 28, 1899, the court awarded to the contractor $1,146.04 as damages in this case.

138. Grays Harbor, Washington.—The low ground around the barn was filled with sand, and many logs and roots of trees were removed and a covering of loam and manure was put around the buildings to hold the sand in place. A plank road was built from the public road to the barn along the east side of the assistant keeper's dwelling. On April 19, 1899, the contractor for the erection of the station filed suit in the United States circuit court against the United States to recover compensation for additional labor in erecting the buildings for this station. This case was tried on June 27, 1900, but as yet no decision has been rendered.

146. Cape Flattery, Washington.—Bids were invited by advertisement to repair the tower and fog-signal buildings and to build an oil-house. As no bids were received, the work will be done by hired labor and purchase of material in open market. The material is now being delivered at the station and soon the work will be started.

—. *Slip Point, Clallam Bay, Strait of Juan de Fuca, Washington.*—By act of June 6, 1900, $12,500 was appropriated to establish a light-house and fog-signal at Slip Point, Clallam Bay, Washington. Work on the plans and specifications will be started soon.

149. New Dungeness, Washington.—The fog-signal apparatus was thoroughly overhauled and put in good condition.

The following recommendation was made in the Board's last five annual reports:

The dwellings erected at this station are arranged for the accommodation of two families and one single man: but as there are four keepers employed, and sometimes three of them with families, there is insufficient accommodation, and a new dwelling is urgently needed. The estimated cost of a suitable building, cistern, outhouse, etc., for this station is $4,000.

It is now estimated that $4,500 will be required for the construction of this dwelling, and it is recommended that an appropriation of that amnout be made therefor.

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152. Admiralty Head, Washington.—The drawings and specifications for the new buildings, which are to be erected by the War Department, are under consideration.

156. Battery Point post light, Puget Sound, Washington.—The following recommendation, made in the Board's last five annual reports, is renewed:

The establishment of a fog-signal at this point is strongly urged. It is estimated that a fog bell, with suitable dwelling, grounds, etc., could be erected for $6,000, and it is recommended that an appropriation of this amount be made therefor.

157. Point No Point, Washington.—By act of July 1, 1898, $6,000 was appropriated to establish a first-class fog-signal here in place of the fog bell. The fog-signal building was completed on November 30, 1898, and consists of an engine room, an oil room, a closet, and a passage. The foundation and floor are of concrete, the walls of brick, the inside of the engine room is furred with 1½-inch hollow tile, and all the walls inside and outside are cemented. The roof consists of 9-inch steel beams, arched in with hollow tile, covered with concrete and asphaltum. The gutters are molded in concrete and are provided with galvanized-iron leaders, the windows have stone sills, all mill work is of fir, and the window sash is of cedar. Various repairs were made.

162. Robinson Point, Washington.—A new fog-signal boiler was put in place, and the whole apparatus was overhauled and put in good working order.

The following recommendation was made in the Board's last three annual reports:

Now that there is a fog-signal here, an additional keeper is much needed. But the keeper's dwelling is barely sufficient for the present keeper and his family. An additional keeper's dwelling is therefore an urgent necessity. It is estimated that a suitable building can be erected for not exceeding $3,000, and it is recommended that an appropriation of that amount be made therefor.

It is now estimated that $4,000 will be required for the construction of this dwelling, and it is recommended that an appropriation of that amount be made therefor.

163. Point Brown post light, Puget Sound, Washington.—By act of June 6, 1900, $6,000 was appropriated to establish this light and fog-signal. Work on the plans and specifications will be started at once.

—. *Burrows Island, Rosario Strait, Washington.*—The following recommendation, made in the Board's last three annual reports, is renewed:

There is much traffic through Rosario Strait, which will naturally increase in the future. During certain seasons of the year fog and smoke from forest fires prevail. Burrows Island is a point of departure for most of the vessels plying the strait. The tides and currents here are strong and variable, and there are several dangerous reefs in the immediate vicinity. A light and fog-signal at the southwest point of Burrows Island would be of great use to commerce and navigation. It is estimated that they could be established for not exceeding $15,000, and it is recommended that an appropriation of this amount be made therefor.

187. Semiahmoo Harbor, Semiahmoo Bay, Gulf of Georgia, Puget Sound, Washington.—The following recommendation, made in the Board's last three annual reports, is renewed:

There is now a post light at Semiahmoo. While it is useful, it is insufficient for the needs of commerce. Blaine, the principal town in these waters, has a population of some 1,500, and certain lumber interests. At Semiahmoo, on the

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opposite side of the bay, which is narrow, there is a large cannery. Several lines of steamers from Vancouver on the north and Tacoma on the south touch at Blaine. During the fishing season this commerce is increased by vessels running in connection with the cannery. The harbor is difficult to enter, particularly at night. A small light and fog-signal would be of much service to commerce. It is estimated that they could be established for not exceeding $25,000, and it is recommended that an appropriation of this amount be made therefor.

189. Turn Point, Washington.—The old hot-air engines were taken down and two oil engines of 1½ horsepower each were installed. Cooling tanks were also placed and the necessary pipe connections made. A redwood tank of 960 gallons capacity was built, connected, and placed in position in the coal room of fog-signal building, and the whole fog-signal apparatus overhauled and put in good working order. Various repairs were made.

190. Patos Island, Washington.—The old hot-air engines used in operating the fog-signal were taken down and two oil engines of 1½ horsepower each were installed in their places. Cooling tanks were placed. A redwood tank of 960 gallons capacity was built, connected, and placed in positton in the coal room of fog-signal building, and the whole apparatus was overhauled and put in good working order. Other repairs were made.

Alaskan light-houses.—The Board, in the preface to its last annual report, made the following statement:

With regard to the aids to navigation proposed, the Board has carefully considered the various petitions and memorials and has made such examination of proposed sites as was found practicable during the past season. As a result eleven stations have been selected and an approximate estimate of cost prepared which is the basis of the recommendation now made that $300,000 be appropriated for the establishment of aids to navigation in Alaskan waters, which appear to be imperatively demanded by the interests of navigation. The localities selected are: Eldred Rock, Ralston Island, Point Retreat, Point Gardner, Cape Ommaney, Point Stanhope, Fairway Island, Guard Island, Mary Island, Cape Fox, and Cape Fanshaw.

The Treasury Department, in its letter of December 18, 1899, to the chairman of the Senate Committee on Commerce in reply to his letter of December 11, 1899, asking the views of the Department relative to a bill making an appropriation for aids to navigation in Alaskan waters, stated:

Since the Board's annual report and estimates, containing the above-named recommendation, went to press the Board has received information from which it appears that this amount will be entirely insufficient. The Board is now of the opinion that the amount named in the bill—$500,000—can be judiciously expended in the establishment of light-houses and fog-signals in Alaskan waters.

By act of June 6, 1900, an appropriation of $100,000 was made to establish * * * light-houses and fog-signals in Alaskan waters. That amount being found insufficient, the Board now recommends the appropriation of $400,000 more for this purpose.

REPAIRS.

Repairs more or less extensive were made at the following-named light-stations:

53. Cape Blanco, Oreg.
55. Cape Arago, Oreg.
63. Umpqua River, Oreg.
71. Cape Meares, Oreg.
115. Warrior Rock, Oreg.
150. Smiths Island, Wash.
151. Point Wilson, Wash.
154. Marrowstone Point, Wash.
159. West Point, Wash.

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POST LIGHTS.

These lights are efficient aids to navigation in the inland waters of Oregon, Washington, and Alaska. With the exception of the lights near La Conner and those in Skagit River, which are inaccessible to the tender, all the lights have been inspected, and, where necessary, the structures have been renovated. The keepers have generally done their work in a satisfactory manner.

LIGHT-VESSELS.

73. Columbia River light-vessel No. 50, off the Columbia River Bar, Oregon.—This composite vessel, which was built in 1891, and has a 12-inch steam fog-signal, broke away on November 29, 1899, from her station off the entrance to the Columbia River, about 7⅞ miles WSW. ⅝ W. from Cape Disappointment light-house, and went ashore near McKenzie Head, Cape Disappointment, Washington. Efforts are being made to get her off the beach, but it is difficult to state when she can be returned to her station. A first-class can buoy, painted black and white, marked "Light-vessel moorings" in white, marks the station.

145. Umatilla Reef light-vessel No. 67, seacoast of Washington.—This composite vessel was built in 1891, is of about 380 tons gross burden, has an electric light and a 12-inch steam fog-signal. On November 17, 1899, she broke adrift. On December 14, 1899, she was replaced on her station. On May 18, 1900, she was temporarily withdrawn for repairs and alteration from electric to oil illumination, and the station was marked by a gas buoy, painted red, with "Light-vessel moorings" in black, and showing a fixed white light. She will be returned to her station as soon as the repairs are completed, when the buoy will be withdrawn.

Relief light-vessel for the Twelfth and Thirteenth light-house districts, Pacific coast.—The following recommendation, made in the Board's last three annual reports, is renewed:

There are now three light-vessels stationed at important points on the Pacific coast, one in the Twelfth and two in the Thirteenth light-house districts. If it becomes necessary to temporarily withdraw any one of these vessels, there is no relief light-vessel to replace it. Such a vessel is urgently needed. It is estimated that one can be built for not exceeding $80,000, and it is recommended that an appropriation of this amount be made therefor.

When this estimate was made, the vessel could have been built for the amount named. Now the price of labor and material has increased to such extent that she can not be built for less than $90,000, and the Board recommends that an appropriation of this amount be made therefor.

DAY OR UNLIGHTED BEACONS.

The day beacons were renovated, and are in good condition.

FOG-SIGNALS OPERATED BY STEAM OR HOT AIR.

54. Coquille River, Oregon.—This Daboll trumpet was in operation some 614 hours and consumed about 13 tons of coal.

55. Cape Arago, Oregon.—This Daboll trumpet was in operation some 539 hours and consumed about 6 tons of coal.

72. Tillamook Rock, Oregon.—This first-class siren was in operation some 181 hours and consumed about 13 tons of coal. This does not include the coal used for heating and cooking.

73. Columbia River light-vessel No. 50, Washington.—This 12-inch

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steam whistle was in operation some 305 hours and consumed about 22 tons of coal.

138. Grays Harbor, Washington.—This first-class siren was in operation some 506 hours and consumed about 45 tons of coal.

144. Destruction Island, Washington.—This first-class siren was in operation some 595 hours and consumed about 36 tons of coal.

145. Umatilla Reef light-vessel No. 67, Washington.—This 12-inch whistle was in operation some 500 hours and consumed about 26 tons of coal.

146. Cape Flattery, Washington.—This 12-inch steam whistle was in operation some 620 hours and consumed about 40 tons of coal.

149. New Dungeness, Washington.—This 12-inch steam whistle was in operation some 263 hours and consumed about 30 tons of coal.

151. Point Wilson, Washington.—This 12-inch steam whistle was in operation some 183 hours and consumed about 21 tons of coal.

157. Point No Point, Washington.—This Daboll trumpet was in operation some 7 hours and consumed about 8 gallons of oil. This fog-signal was established April 1, 1900.

159. West Point, Washington.—This Daboll trumpet was in operation some 165 hours and consumed about 2 tons of coal.

162. Robinson Point, Washington.—This 12-inch whistle was in operation some 92 hours and consumed about 7 tons of coal.

189. Turn Point, Washington.—This Daboll trumpet was in operation some 136 hours and consumed about 26 gallons of oil.

190. Patos Island, Washington.—This Daboll trumpet was in operation some 63 hours and consumed about 20 gallons of oil.

BUOYAGE.

Nine buoys were established and 2 discontinued. The buoys which can be reached by the tender were changed, but owing to the other work the *Manzanita* was required to do the buoy work could not in some cases be attended to as promptly as was desired. All the whistling and bell buoys are in good condition.

DEPOTS.

Tongue Point buoy depot, Oregon.—A portion of the outer warehouse was partitioned off as a storeroom for engineer supplies and material. The inner warehouse was also partitioned off and additional shelving put in. The plumbing of keeper's dwelling was overhauled and a new bath tub, etc., put in place. The water-service pipe leading from the tank to the dwelling was renewed. A portion of the water pipe for supplying the tenders was also renewed.

By act of June 6, 1900, $5,000 was appropriated to erect two isolated oil houses, with a track extending from them to the depot wharf. Work on the plans and specifications for them will be started at once.

The following recommendation, made in the Board's last annual report, is renewed:

There is not room enough at this depot for engineer stores. It is proposed to erect a suitable building on the shore north of the inner warehouse. It is estimated that this can be done for not exceeding $4,000, and the Board recommends that an appropriation of this amount be made therefor.

TENDERS.

Manzanita.—This wooden screw steamer was built in 1879 and is of about 450 tons gross burden. She is in good order and condition.

Thirteenth District.

During the year she steamed some 14,749 miles on about 1,112 tons of coal. She was under steam some 323 days, landed 391 tons of coal at light-stations and on light-vessels, placed, changed, or renovated 211 buoys, repaired and repainted or rebuilt 10 beacons, made 39 inspection trips, landed 371 tons of freight at light and fog signal stations, and when not otherwise employed was engaged at the buoy depot in the work of the district.

Columbine.—This steel screw steamer was built in 1892 and is of about 424 tons gross burden. She was used for construction and repair duty, and in addition set, changed, and renovated 64 buoys, renovated 5 beacons, and landed 195 tons coal and 37 tons material for the light-house inspector's department, and when not otherwise employed was engaged at the buoy depot in the work of the district. On October 9, 1899, she was docked and cleaned and a coat of anticorrosive, over which was added a coat of antifouling compound, was applied the usual height. Between March 19, 1900, and June 2, 1900, her hull was scraped and painted, a new shoe was furnished, the bulwarks were braced, the buoy fenders were renewed, the rail was repaired, the hatch and combings were renewed, and a new mainmast was put in place. The chart house was extended, gratings were furnished for the bridge, and new canvas was laid over the whole of the upper deck. Four folding-bed seats were furnished, the small boats were repaired, new carpets and linoleum were furnished throughout, a new range and a coal box were put into the galley, and the woodwork was renewed, while the inside woodwork of the cabins and saloon were repolished. The boilers were overhauled, stay bolts were put in, and soft patches were extended. In doing this the lower 2 feet of the water-tight bulkhead forward of engine had to be cut and replaced. A full set of tubes were put into the donkey boiler, both cylinders of the main engine were rebored, and new piston rings furnished; the piston rods and brasses were overhauled, the stern bearing was repaired, the steering engine was overhauled, the brass gearing was put in place for handling the engine-room skylights, a steel floor was laid in the lower engine room, a complete new electric plant was installed, and all the piping, packing glands, etc., were overhauled. A new windlass is yet to be put in place.

Heather.—By the act approved March 3, 1899, $100,000 was appropriated for "the construction of a large, powerful, seagoing tender for the Thirteenth light-house district." Plans and specifications were made for this vessel, bids were advertised for and received, but when opened it was found that each was in excess of the amount of the appropriation. These facts were laid before Congress, when, by act approved June 6, 1900, authority was given to contract for this vessel at a total cost not exceeding $120,000. The Board therefore recommends that a further appropriation of $20,000 be made therefor. Bids for the building of this vessel were again asked by advertisement, which resulted in the reception of one bid, and that was for an amount exceeding the amount authorized by the last-named action of Congress. The Board then modified the plans to such an extent that the only bidder for the work was enabled to modify his bid so as to bring it within the amount of the sum specified, when contract was made for the construction of the vessel upon the modified plans. It is expected that she will be ready for duty in the fall of 1901.

FOURTEENTH DISTRICT.

Fourteenth district extends on the Ohio River from Pittsburg, Cairo, Ill., 966 miles; on the Tennessee River, 255½ miles, and Great Kanawha, 73½ miles; in all, a distance of 1,295 miles, ıbraces all the aids to navigation within these limits.

ector.—Commander Charles T. Forse, United States Navy.

ineer.—Maj. William H. Bixby, Corps of Engineers, United Army.

're are in the district—

;hts	485
g lights	38
:eepers	479
tender *Goldenrod*, for supply and inspection	1
·r of day marks	4

he end of the spring trip, June 9, 1900, every station had been l, all posts painted, trees and brush cleared, and everything left :t-class condition. Usual stores were left for the use of each r in case of low water during the fall. The keepers have led to their duties faithfully. Few complaints have been received masters or pilots of steamers.

RECAPITULATION.

ıer of lights	523
ıer of post lights	485
ıer of floating lights	38
ıer of day marks	4
ıer of light-keepers	479
ıer of posts established	4
ıer of lights discontinued	19
ıer of posts moved	4
ıer of posts reset	43
ıer of trees cut	3,608
ber of acres of brush cleared	18
ber of gallons of oil distributed	11,865
ber of gross of wick distributed	59

TENDER.

oldenrod.—This steel stern-wheel steamer was built in 1888, and about 461 tons gross burden. New mud drums and a search- t are soon to be put in, when the tender will be in fine condition. ing the year 2 complete trips of inspection and supply were made. steamed about 5,153 miles and consumed some 596 tons of coal 11½ cords of wood.

FIFTEENTH DISTRICT.

The Fifteenth district extends on the Mississippi River from the head of navigation to Cairo, Ill.; on the Missouri River to Kansas City, Mo., and on the Illinois River from La Salle to its mouth, being in all a distance of 1,582½ miles, and embraces all the aids to navigation within these limits.

Inspector.—Commander H. B. Mansfield, United States Navy, to December 18, 1899; Lieut. Commander James M. Helm, United States Navy, to February 15, 1900; since then, Commander U. R. Harris, United States Navy.

Engineer.—Lieut. Col. Amos Stickney, Corps of Engineers, United States Army.

Number of fixed and floating lights on June 30, 1899	513
Lights established	33
Lights discontinued	28
Number of keepers	355
Number of channel marks	96
Number of trees cut down above 4 inches in diameter	3,946
Number of acres cleared of willows and underbrush	84½
Number of gallons of oil issued	11,574
Wicks issued, gross	19½
Steamer *Lily*, for supply and inspection	1

During the year the tender made 3 trips to the Upper Mississippi River, 6 trips to the Lower Mississippi River, and 1 trip to the Illinois River. The details of the work done, changes made, etc., are shown in the following:

RECAPITULATION.

Miles steamed	5,685½
Lights established	33
Lights discontinued	28
Increase	5
Number of fixed and floating lights in operation	513
Number of day marks (diamond boards)	160
Number of keepers	355
Number of trees cut above 4 inches in diameter	3,946
Acres of willows and underbrush cut	84½
Coal consumed, bushels	25,402
Oil issued (illuminating), gallons	11,574
Wicks issued, gross	19½

Navigation closed in the Mississippi and Illinois rivers as follows:

MISSISSIPPI RIVER.

St. Paul to Reeds Landing, November 15; Reeds Landing to Lyons, November 20; Lyons to Burlington, November 30; Burlington to Keokuk, November 20; Keokuk to Canton, November 30; Canton to Clarksville, November 18; Clarksville to St. Louis, November 30.

ILLINOIS RIVER.

Sand Point to Peoria, November 9; Peoria to Beardstown, November 22; Beardstown to mouth of Illinois River, November 30.

Fifteenth District.

The average date of discontinuance of lights was on November 19, 1899.

Between St. Louis and Cairo navigation was suspended during the winter for about thirty days in all, on account of ice, and the lights during this time were not in operation.

In the spring lights were started as follows:

MISSISSIPPI RIVER.

St. Paul to Lansing, May 1, 1900; Lansing to Rock Island, April 10, 1900; Rock Island to Clarksville, April 1, 1900; Clarksville to St. Louis (average), March 15, 1900.

TENDER.

Lily.—This vessel is a wooden, side-wheel steamer, built in 1875, and is of about 507 tons gross burden. She made 10 trips of supply and inspection, 3 trips on the Mississippi River above St. Louis, 6 on the Mississippi River between St. Louis and Cairo, and 1 on the Illinois River. No lights were exhibited on the Missouri River. She steamed about 5,685 miles and consumed some 907 tons of coal. She was docked, her hull was calked, and some slight repairs were made upon the engines and upon the dynamo engine.

ILLINOIS RIVER.

The average date of starting lights was March 22, 1900.

The keepers on the Mississippi and Illinois rivers were, as a rule, attentive to their duties. Some few complaints of lights being out were received from pilots, and the keepers of those lights who did not give a satisfactory excuse therefor had their pay reduced accordingly.

Lights in the Missouri River were not started this year, as no boats are navigating that river. These lights have not been in operation since September, 1896, nor has the tender made a visit to the stations on that river since April, 1898. The outfits are still in charge of the former keepers.

From reports of masters and pilots, it is evident that the efficiency of the district has been maintained, and that the work is appreciated.

A number of day marks, in the shape of diamond boards, were added where needed.

SIXTEENTH DISTRICT.

The Sixteenth district extends on the Mississippi River from Cairo, Ill., to New Orleans, La., and on the Red River a distance of 8 miles, being in all a distance of 966 miles, and embraces all the aids to navigation within these limits.

Inspector.—Lieut. Commander James M. Helm, United States Navy.

Engineer.—Capt. H. C. Newcomer, Corps of Engineers, United States Army, to January 11, 1900; since then Capt. C. L. Potter, Corps of Engineers, United States Army.

In this district there are—

Post lights	360
Light-keepers	336
Laborers attending post lights dropped	118
Laborers attending post lights employed	101
Steamer *Joseph Henry*, for supply and inspection	1

POST LIGHTS.

There are in this district 360 post lights, cared for by 336 keepers, making an increase of 2 post lights and 17 keepers in the past year. The efficiency of the lights has been well maintained and the service rendered by the keepers was fairly satisfactory. The policy of increasing the illuminating powers of the tubular lanterns in use in the district by the addition of Fresnel globes was followed as far as the finances of the district would permit, and there are now comparatively few of the old style of lanterns in use. In addition, cross-boards 12 feet long were placed at all important crossings as marks. The aggregate amount of the monthly pay roll of keepers of post lights at this date is $3,103, an average of $8.62 per month per post light, or the same as that of last year.

Complete inspections of the district were made during each quarter of the year. During the year 1,484 post lights were visited, painted, supplied, and the keepers were paid; 30 post lights were established; 28 post lights were discontinued and 285 post lights were moved; 118 laborers attending post lights were dropped and 101 laborers were employed to attend post lights. About 2,026 trees were felled, each over 4 inches in diameter; over 50 acres of willows, brush, etc., were cleared; 13,500 gallons of mineral oil and 80 gross of wicks were used in maintaining these post lights.

TENDERS.

Joseph Henry.—This wooden side-wheel steamer was built in 1880, and is of 453 tons gross burden. During the year she steamed about 8,072 miles and burned some 1,353 long tons of coal. She was under steam, exclusive of 226 days on the donkey boiler, 139 days. The machinery was in motion, exclusive of the electric-light engine, for about 60 days. This tender has been condemned. By the sundry civil act approved June 6, 1900, Congress appropriated $30,000 toward building a new tender, and authorized a contract for the purpose not exceeding $60,000. A further appropriation of $30,000 is therefore

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